Contact Lenses

A Medical Dictionary, Bibliography,
and Annotated Research Guide to
Internet References

James N. Parker, M.D.
and Philip M. Parker, Ph.D., Editors

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The collective knowledge generated from academic and applied research summarized in various references has been critical in the creation of this book which is best viewed as a comprehensive compilation and collection of information prepared by various official agencies which produce publications on contact lenses. Books in this series draw from various agencies and institutions associated with the United States Department of Health and Human Services, and in particular, the Office of the Secretary of Health and Human Services (OS), the Administration for Children and Families (ACF), the Administration on Aging (AOA), the Agency for Healthcare Research and Quality (AHRQ), the Agency for Toxic Substances and Disease Registry (ATSDR), the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), the Healthcare Financing Administration (HCFA), the Health Resources and Services Administration (HRSA), the Indian Health Service (IHS), the institutions of the National Institutes of Health (NIH), the Program Support Center (PSC), and the Substance Abuse and Mental Health Services Administration (SAMHSA). In addition to these sources, information gathered from the National Library of Medicine, the United States Patent Office, the European Union, and their related organizations has been invaluable in the creation of this book. Some of the work represented was financially supported by the Research and Development Committee at INSEAD. This support is gratefully acknowledged. Finally, special thanks are owed to Tiffany Freeman for her excellent editorial support.

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FORWARD

In March 2001, the National Institutes of Health issued the following warning: "The number of Web sites offering health-related resources grows every day. Many sites provide valuable information, while others may have information that is unreliable or misleading."[1] Furthermore, because of the rapid increase in Internet-based information, many hours can be wasted searching, selecting, and printing. Since only the smallest fraction of information dealing with contact lenses is indexed in search engines, such as **www.google.com** or others, a non-systematic approach to Internet research can be not only time consuming, but also incomplete. This book was created for medical professionals, students, and members of the general public who want to know as much as possible about contact lenses, using the most advanced research tools available and spending the least amount of time doing so.

In addition to offering a structured and comprehensive bibliography, the pages that follow will tell you where and how to find reliable information covering virtually all topics related to contact lenses, from the essentials to the most advanced areas of research. Public, academic, government, and peer-reviewed research studies are emphasized. Various abstracts are reproduced to give you some of the latest official information available to date on contact lenses. Abundant guidance is given on how to obtain free-of-charge primary research results via the Internet. **While this book focuses on the field of medicine, when some sources provide access to non-medical information relating to contact lenses, these are noted in the text.**

E-book and electronic versions of this book are fully interactive with each of the Internet sites mentioned (clicking on a hyperlink automatically opens your browser to the site indicated). If you are using the hard copy version of this book, you can access a cited Web site by typing the provided Web address directly into your Internet browser. You may find it useful to refer to synonyms or related terms when accessing these Internet databases. **NOTE:** At the time of publication, the Web addresses were functional. However, some links may fail due to URL address changes, which is a common occurrence on the Internet.

For readers unfamiliar with the Internet, detailed instructions are offered on how to access electronic resources. For readers unfamiliar with medical terminology, a comprehensive glossary is provided. For readers without access to Internet resources, a directory of medical libraries, that have or can locate references cited here, is given. We hope these resources will prove useful to the widest possible audience seeking information on contact lenses.

The Editors

[1] From the NIH, National Cancer Institute (NCI): **http://www.cancer.gov/cancerinfo/ten-things-to-know**.

CHAPTER 1. STUDIES ON CONTACT LENSES

Overview

In this chapter, we will show you how to locate peer-reviewed references and studies on contact lenses.

The Combined Health Information Database

The Combined Health Information Database summarizes studies across numerous federal agencies. To limit your investigation to research studies and contact lenses, you will need to use the advanced search options. First, go to **http://chid.nih.gov/index.html**. From there, select the "Detailed Search" option (or go directly to that page with the following hyperlink: **http://chid.nih.gov/detail/detail.html**). The trick in extracting studies is found in the drop boxes at the bottom of the search page where "You may refine your search by." Select the dates and language you prefer, and the format option "Journal Article." At the top of the search form, select the number of records you would like to see (we recommend 100) and check the box to display "whole records." We recommend that you type "contact lenses" (or synonyms) into the "For these words:" box. Consider using the option "anywhere in record" to make your search as broad as possible. If you want to limit the search to only a particular field, such as the title of the journal, then select this option in the "Search in these fields" drop box. The following is what you can expect from this type of search:

- **Glasses: My Eye**

  Source: Living Well With Diabetes. 8(4): 20-21. Fall 1993.

  Contact: Available from CHRONIMED Publishing, Inc. P.O. Box 47945, Minneapolis, MN 55305. (800) 848-2793.

  Summary: This article reviews the use of **contact lenses** by people with diabetes mellitus. Topics include some of the benefits and risks of contacts; how diabetes may affect use of **contact lenses**; the importance of careful care of the cornea; caring for **contact lenses**; and working with an eye care professional. The author encourages readers to consider trying **contact lenses** if they need corrective lenses. 1 figure.

- **Eyes: An Owner's Manual**

  Source: Diabetes Self-Management. 8(5): 21-25, 28. September-October 1991.

  Contact: Available from R.A. Rapaport Publishing Company. 150 West 22nd Street, New York, NY 10011. (800) 234-0923.

  Summary: This article, written for people with diabetes, reviews the basics of eye care. Topics include the anatomy of the eye; definitions of the terms ophthalmologist, optometrist, and optician; recommendations for frequency and type of eye care; common eye problems; **contact lenses**; the role of vitamins in good eye care; the use of sunglasses; the effects of working at a computer terminal; and the effects of aging on the eyes; The author concludes the article with eight questions and answers about eye care; an eye chart for home testing; a list of tips for contact-lens wearers; and a personal eye exam that tests macular function.

Federally Funded Research on Contact Lenses

The U.S. Government supports a variety of research studies relating to contact lenses. These studies are tracked by the Office of Extramural Research at the National Institutes of Health.[2] CRISP (Computerized Retrieval of Information on Scientific Projects) is a searchable database of federally funded biomedical research projects conducted at universities, hospitals, and other institutions.

Search the CRISP Web site at **http://crisp.cit.nih.gov/crisp/crisp_query.generate_screen**. You will have the option to perform targeted searches by various criteria, including geography, date, and topics related to contact lenses.

For most of the studies, the agencies reporting into CRISP provide summaries or abstracts. As opposed to clinical trial research using patients, many federally funded studies use animals or simulated models to explore contact lenses. The following is typical of the type of information found when searching the CRISP database for contact lenses:

- **Project Title: A NEW ARTIFICIAL CORNEAL PROSTHESIS (KPRO)**

  Principal Investigator & Institution: White, Thomas C.; Tamcenan Corporation 1703 S Minnesota Ave Sioux Falls, SD 57105

  Timing: Fiscal Year 2002; Project Start 01-APR-2002; Project End 30-SEP-2002

  Summary: (provided by applicant): About 4 to 8 thousand people yearly in the U.S. suffer blinding corneal disease not amenable to conventional keratoplasty. The improved keratoprosthesis (KPro) may restore functional vision for these people, and is the basis for a significant demand supporting commercialization. This Phase I project involves developing an improved thinner KPro of PMMA that, with a significant innovative process, can be more securely fixated to a donor cornea for use as a standard graft. The measurable goals are: 1) developing a KPro production methodology to produce powers within +0.5D accuracy; 2) demonstration of the fusion of front and back flanges with a narrow gap of 0.5-0.7mm with strength of 50 Newtons; 3) an independent laboratory determination of bioburden and ethylene oxide sterilization validation, and

[2] Healthcare projects are funded by the National Institutes of Health (NIH), Substance Abuse and Mental Health Services (SAMHSA), Health Resources and Services Administration (HRSA), Food and Drug Administration (FDA), Centers for Disease Control and Prevention (CDCP), Agency for Healthcare Research and Quality (AHRQ), and Office of Assistant Secretary of Health (OASH).

toxicology testing. Reaching these endpoints will permit processing directly to a Clinical Trial in Phase II project under FDA Guidance Document for Keratoprostheses. Tamcenan Corporation, and the Principle Investigator have experience in developing and securing regulatory clearence and comericalization of ophthalmic implants. Engineering & Ophthalmic Services has experience in devising manufacturing protocols for **contact lenses** and Kpros. Geneva Laboratories, Inc. is a full service certified testing laboratory that follows accepted protocols for required tests. PROPOSED COMMERCIAL APPLICATION: The estimated 4 to 8 thousand patients in the U.S. yearly that cannot be adequately served by standard keratoplasty or existing KPros form a significant market for commercialization of a product that costs between $500.00 and $1000.00. The participation of Eye Banks in this project will aid distribution and increase rewards for those participating.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: ADVANCED BIFOCAL CONTACT LENS**

  Principal Investigator & Institution: Mandell, Robert B.; Softfocal Company, Inc. 69 Sullivan Dr Moraga, CA 94556

  Timing: Fiscal Year 2002; Project Start 30-SEP-2002; Project End 29-SEP-2003

  Summary: (provided by applicant): The long-term objectives of this project are to:1) provide a soft bifocal contact lens that will overcome the drawbacks of current soft bifocal **contact lenses;** 2) provide a soft bifocal contact lens that will have better image forming properties than that of previous soft bifocal **contact lenses** and give optimal vision to the wearer for viewing both distance and near objects; 3) provide a soft bifocal contact lens that is relatively inexpensive to manufacture, using air-bearing, computer controlled lathing or molding techniques; 4) expand the number of patients who are able to wear bifocal **contact lenses.** The specific aims of this project are to: 1) transform the design for a newly patented rigid gas permeable bifocal contact lens into a design that is suitable for a soft contact lens; 2) produce a soft bifocal contact lens that will take advantage of the anatomical structure of the eye and lids for purposes of generating a vertical shifting or translational movement, so as to present one or another optical power to the eye at the desired time; 3) develop software and manufacturing techniques for the proposed lens construction that can be executed using air-bearing computer-controlled lathes.The major effort of this project will be directed towards programming and test manufacturing of a recently developed rigid bifocal contact lens design, modified to produce an advanced soft bifocal contact lens. The proposed soft bifocal contact lens design has a distinct advantage over present lenses because of two features: 1) spherical optics for both distance and near lens power areas connected by a unique transition curve that eliminates visual image jump based on a modified form of monocentricity and 2) lens design features that provide controlled lens translation on the eye in order to place the desired lens power area in front of the entrance pupil of the wearer at the desired time.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: BIOFILM FORMATION AND P. AERUGINOSA INFECTION OF THE EYE**

  Principal Investigator & Institution: Zegans, Michael E.; Surgery; Dartmouth College 11 Rope Ferry Rd. #6210 Hanover, NH 03755

  Timing: Fiscal Year 2002; Project Start 01-AUG-2002; Project End 31-JUL-2007

Summary: (Applicant's Abstract) Bacterial infections of the eye can have vision-threatening complications and often are associated with prosthetic devices such as **contact lenses,** scleral buckles, and intraocular lenses. Pseudomonas aeruginosa (PA) is one of the most common causes of bacterial keratitis. The central hypothesis of this proposal is that biofilm formation plays an important role in the pathogenesis of ocular infections of PA and that an understanding of the biology and genetics of Pseudomonas aeruginosa biofilm formation will have relevance to the development of novel antimicrobial therapies. Bacteria grow as planktonic (or free-living) cells or as surface-attached communities known as biofilms. Biofilm formation contributes to the pathogenesis of many clinical infections associated with prosthetic devices by allowing bacteria to persist on abiotic surfaces which come in contact with the body, by facilitating colonization of biotic surfaces and by rendering bacteria more resistant to antimicrobial agents. However, the relevance of biofilm formation to ocular infections has not been extensively studied. Bacterial keratitis caused by PA will be the model system studied in this project. Existing biofilm mutants of PA, as well as additional mutants that will be developed in the course of the project, will be used to elucidate the biology and genetics related to PA biofilm formation on abiotic and biotic surfaces relevant to the eye. The functions mutated in these strains may define novel drug targets. In addition, inhibitor studies may identify new classes of compounds that prevent and/or eliminate eye infections. The ability of growth in a biofilm to render PA resistant to the innate immune system, specifically the human B-defensin (hBD) 1 and 2 will be investigated. hBD 1 and 2 are recently described antimicrobial peptides secreted by the corneal and conjunctival epithelium. hBD 1 and 2 are active against PA under planktonic conditions, but have not been tested against organisms growing in a biofilm. If biofilm-based resistance exists, it would presumably contribute to keratitis and identification of genes that play a role in this process may be novel targets for rendering biofilm bacteria sensitive to antibiotics and defensins. If biofilm and planktonic cells are as equally sensitive to hBD-l and hBD-2, this would suggest that B-defensins can bypass biofilm-specific biocide resistance, and furthermore, these compounds (or derivatives) might make excellent therapeutics to prevent and/or treat biofilm-based infections.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CELL-CELL COMMUNICATON IN BACTERIAL QUORUM SENSING**

  Principal Investigator & Institution: Levchenko, Andre; Assistant Professor; Biomedical Engineering; Johns Hopkins University 3400 N Charles St Baltimore, MD 21218

  Timing: Fiscal Year 2003; Project Start 15-AUG-2003; Project End 31-JUL-2008

  Summary: (provided by applicant): Quorum sensing is a complex, collective behavior displayed by a variety of bacterial species when the cell population density exceeds the critical value. Examples of processes modulated by quorum sensing are the development of genetic competence, conjugative plasmid transfer, sporulation and cell differentiation, biofilm formation, virulence response, production of antibiotics, antimicrobial peptides and toxins, and bioluminescence. Collective behavior in quorum sensing can result in the formation of biofilms, highly organized and spatially structured bacterial colonies encased in polysaccharide gels. The U.S. Centers for Disease Control has estimated that biofilms cause 65 percent of infections in the developed world. Biofilm formation plagues the use of intravenous, endotracheal and urinary tubes, surgical sutures, catheters and **contact lenses.** Biofilms can display very sophisticated temporal and spatial self-organizing behavior characteristic of complex systems. Therefore quantitative understanding of the mechanisms underlying quorum sensing is essential for combating developing infectious diseases in clinic. Here we propose to

investigate adaptive properties of quorum sensing both theoretically, by construction of computational model of randomly seeded interacting cells and experimentally, by investigating single cell and population responses in an experimental model of quorums sensing: Vibrio fischeri. In particular, we will investigate the hypothesis that biphasic regulation of diffusible autoinducer production by individual cells on the local autoinducer concentration makes quorum sensing robust to global and local variations in cell density. In addition, we will verify the prediction that biphasic nature of autoinducer autoregulation allows cells to reduce high metabolic load necessary to maintain high level quorum response. These hypotheses suggest high degree of adaptability and robustness in quorum sensing response. The model proposed is an example of an algorithmic, bottom-up approach that allows to take the natural noisiness and variability into account in the analysis of experimental data. As a part of the proposal we will develop a novel method for analysis of V. fischeri quorum sensing at very high cell densities, normally not allowed in the batch liquid cell culture. Following verification, the model development will be extended to include multi-species interaction in biofilm formation and analysis of biofilm structure in light of quorum sensing.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CELLULAR IMMUNITY TO P. AERUGINOSA CANDIDATE VACCINES**

  Principal Investigator & Institution: Priebe, Gregory P.; Brigham and Women's Hospital 75 Francis Street Boston, MA 02115

  Timing: Fiscal Year 2001; Project Start 01-JUL-2001; Project End 30-JUN-2006

  Summary: (provided by applicant): The central goal of this project is to understand the role of cellular immunity in infections caused by LPS-smooth strains of P. aeruginosa. These strains are significant pathogens for hospitalized patients and wearers of extended-use **contact lenses.** Recent evidence suggests that during the course of lung and eye infections, P. aeruginosa enters epithelial cells via the cystic fibrosis transmembrane conductance regulator. To study the immune response to the intracellular base of infection, live, attenuated P. aeruginosa strains having an unmarked deletion of the aroA gene have been constructed. Preliminary studies reveal that intranasal (IN) immunization with one such mutant protects against keratitis or lethal pneumonia in murine models. Splenic T cells from immunized mice can kill intracellular P. aeruginosa. Interestingly, passive transfer of antiserum is more protective against corneal infections than lung infections. The candidate will further define the cellular immunity to aroA deletion mutants of P. aeruginosa and test the following hypothesis: The protective efficacy of IN immunization with live, attenuated P. aeruginosa vaccine strains requires both humoral and cellular immune effecters, and the relative contribution of each effecter towards protection is different in different sites of infection. In Aim 1, the cellular immune effecters elicited by aroA deletants of P. aeruginosa will be delineated using immunomagnetic depletion coupled with assays for intracellular bacterial killing, T cell proliferation, and cytolysis. In Aim 2, P. aeruginosa specific T cell clones from IN-immunized mice will be derived and characterized. The candidate seeks an intensive, formal, mentored training to provide the necessary intellectual and technical tools to achieve independence as a scientist. As a specialist in pediatric critical care and infectious diseases, his long-term goal is to develop effective immune-based interventions to prevent or ameliorate the consequences of P. aeruginosa infections.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CLEK STUDY PHOTOGRAPHY READING CENTER**

  Principal Investigator & Institution: Barr, Joseph T.; None; Ohio State University 1800 Cannon Dr, Rm 1210 Columbus, OH 43210

  Timing: Fiscal Year 2001; Project Start 30-SEP-1994; Project End 29-SEP-2004

  Summary: The Collaborative Longitudinal Evaluation of Keratoconus (CLEK) Photography Reading Center (CPRC) provides objective, independent photographic verification of two important components of the CLEK Study: 1.) the presence, absence, and degree of severity of corneal scarring in all study eyes and, 2.) the rigid contact lens fit (fluorescein pattern) in all study eyes that wear rigid **contact lenses,** as well for the first rigid contact lens base curve that provides clearance of the corneal apex. This proposal provides documentation of the CPRC's ability to perform these functions with high sensitivity and specificity. This proposal also provides a description of the day-to-day organization of work, quality control and data management procedures required to insure the scientific integrity of the CLEK Study and to insure the orderly operation of the CPRC. Documentation of the capabilities of the proposed CPRC Staff for the performance of the Study in accord with the details of the CPRC Operations Manual and with the CLEK Study Operations Manual is provided.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: COLLABORATIVE LONGITUDINAL EVALUATION KERATOCONUS STUDY**

  Principal Investigator & Institution: Zadnik, Karla S.; Glenn A. Fry Professor of Optometry And; None; Ohio State University 1800 Cannon Dr, Rm 1210 Columbus, OH 43210

  Timing: Fiscal Year 2001; Project Start 30-SEP-1994; Project End 29-SEP-2004

  Summary: Keratoconus is typically characterized by marked irregular corneal astigmatism and corneal thinning, resulting in long-term dependence on rigid gas permeable **contact lenses** for correcting the corneal irregularity and producing usable vision. Keratoconus is diagnosed typically during young adulthood, and the disease compromises vision during the patients' prime education and earning years. It is one of the most common diseases managed by cornea specialists and accounts for much of the time spent by contact lens practitioners. Currently employed management methods typically include, successively, spectacle correction, rigid **contact lenses,** and penetrating keratoplasty as the disease progresses. The objective of the Collaborative Longitudinal Evaluation of Keratoconus (CLEK) Study is to characterize the progression of keratoconus over a broad spectrum of disease severity. The Study will include patients 12 through 65 years of age who have unilateral corneal irregularity and evidence of either Vogt's striae, Fleischer's ring, or corneal scarring in at least one eye. The progression of keratoconus will be measured by changes in visual acuity (high and low contrast Bailey-Lovie with best correction, habitual correction, and manifest refraction), visual quality of life, corneal curvature (keratometry), the contact lens base curve required for definite apical clearance of the cornea, and central corneal scarring. Thirteen Participating Clinics will recruit and follow a total of 1,000 keratoconus patients. CLEK Study patients will be examined annually for three years. Resource centers for the CLEK Study are the Study Chairman's Office at the University of California at Berkeley School of Optometry, Berkeley, California, the CLEK Data Coordinating Center at Washington University Medical School, St. Louis, Missouri, and the CLEK Photography Reading Center at The Ohio State University College of Optometry, Columbus, Ohio.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CONTACT LENSES AND MYOPIA (CLAMP) STUDY**

  Principal Investigator & Institution: Walline, Jeffrey J.; None; Ohio State University 1800 Cannon Dr, Rm 1210 Columbus, OH 43210

  Timing: Fiscal Year 2001; Project Start 01-DEC-1997; Project End 30-NOV-2002

  Summary: The **Contact Lenses** and Myopia Progression (CLAMP) Study will serve two purposes: 1) it will provide the training mechanism for Jeffrey J. Walline, O.D. to become a successful independent investigator and 2) it will evaluate the effect of rigid **contact lenses** on myopia progression in children. The CLAMP Study applies itself very well to furthering Dr. Walline's education and clinical experience. The CLAMP Study will generate the basis for Dr. Walline's qualifying examinations and his doctoral thesis, which will focus on his coursework in Physiological Optics and Preventive Medicine. Dr. Walline will serve as Principal Investigator and will gain valuable experience in all aspects of clinical research. He will be responsible for the recruitment, retention, ocular examination, and contact lens fitting of 110 children, most data collection, all data input and analysis, and the administrative functions of the entire study. The training plan, combined with the wide range of responsibilities in conducting this small-scale study, will produce an independent clinician-scientist who has learned the trials and tribulations of clinical research by direct application of his training and by personal experience. The CLAMP Study will examine the effects of rigid **contact lenses** on myopia progression in nearsighted children over a three-year period and will attempt to determine the mechanism of treatment effect if one exists. We will conduct a single-masked, randomized clinical trial on 110 children ages 8 to 11 years old who have between -1.00 D and -3.00 D (spherical component) of myopia in each eye, less than 1.00 D of astigmatism in both eyes, less than 1.00 D of anisometropia, no ocular or systemic health problems that may affect vision, and at least 20/20 best corrected visual acuity in both eyes. All subjects will be given a comprehensive baseline examination and fitted with rigid **contact lenses;** those who meet the minimum requirements for rigid contact lens adaptation will be randomized to the experimental group (rigid contact lenses) or to the control group (soft contact lenses). Annual examinations will be given to all children to determine their myopic progression, and to measure their ocular components. Their vision correction will be updated every six months. The CLAMP Study is the ideal scope and size of study to train Dr. Walline to become an independent investigator and has the potential to change the standard of care for young children who become nearsighted.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CORNEAL HBD-2 REGULATION BY PSEUDOMONAS AERUGINOSA**

  Principal Investigator & Institution: Maltseva, Inna; Optometry; University of California Berkeley Berkeley, CA 94720

  Timing: Fiscal Year 2003; Project Start 01-MAY-2003; Project End 30-APR-2008

  Summary: (provided by applicant): The goal of this training grant is to prepare Inna Maltseva, O.D. for a career as an independent investigator of basic mechanisms of corneal disease with a focus on cell biology. Developmental Plan. A five-year research career development plan is proposed to supplement her previous clinical training with advanced training in the basic science disciplines of cell biology, molecular biology, and microbiology as they relate to corneal disease. The proposed program integrates didactic coursework, seminars. and laboratory research experience in state-of-the-art

methodologies at the University of California, Berkeley (UCB) and University of California, San Francisco (UCSF). Dr. Maltseva activities will be supervised by two mentors: Suzanne M.J. Fleiszig, O.D., Ph.D. (School of Optometry, UCB) and Carol Basbaum, Ph.D. (Department of Anatomy, UCSF). Research Plan. Microbial keratitis remains one of the most destructive diseases of the cornea, leading to blindness. To prevent this, the human eye produces a spectrum of antimicrobial peptides including human beta-defensin-2 (hBD-2). Its expression is dramatically induced by various stimuli including Gram-negative bacteria. Paradoxically, despite multiple anti-bacterial defense systems, extended use of **contact lenses** predisposes the cornea to serious infection by Pseudomonas aeruginosa. We have reproduced this phenomenon in vitro and observed that it is correlated with a profound defect in the ability of corneal cells to produce hBD-2 in response to P. aeruginosa culture supernatant. To understand this defect we need to understand the mechanisms controlling the production of hBD-2 by corneal cells in response to bacteria in the absence of **contact lenses.** This will lay the groundwork for comparisons between contact lens-exposed and non-exposed cells. The focus will be on dissecting signal transduction mechanisms leading to new transcription of hBD-2 (Specific Aim 1), defining transcription factor (s) (Specific Aim 2) and the effect of contact lens wear on this pathway (Specific Aim 3). The results of the proposed study will provide new insight into bacterial-epithelial interactions in the eye. Furthermore, the knowledge provided by the investigation could suggest pharmacological intervention during corneal bacterial infection.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CORNEAL METABOLIC ACTIVITY IN HUMANS**

  Principal Investigator & Institution: Bonanno, Joseph A.; Professor; None; Indiana University Bloomington P.O. Box 1847 Bloomington, IN 47402

  Timing: Fiscal Year 2001; Project Start 01-MAY-2000; Project End 30-APR-2003

  Summary: Contact lens wear is a safe and effective form of correction for refractive error. However, a significant number of people are unable to wear lenses because of chronic corneal edema. Previous studies have shown significant individual differences in the amount of corneal edema produced by contact lens-induced hypoxia. We will test the hypothesis that individual differences in corneal edema are associated with individual differences in metabolic activity of the cornea. In a large group of normal subjects we will measure corneal edema, oxygen consumption (Qc) and acid load produced by wearing **contact lenses** of high, medium and low oxygen transmissibility. Corneal edema will be determined by measuring corneal swelling following three hours of closed eye lens wear. Oxygen consumption will be determined by using a new non-invasive technique for measuring tear oxygen tension (PO2) under **contact lenses** of known oxygen transmissibility. Hypoxic acid load will be determined by measuring the change in corneal stromal pH during closed eye contact lens wear. Our hypothesis predicts that individuals with a relatively high Qc will have lower tear Po2 (i.e., relatively more hypoxia) for a given contact lens wearing condition. In order to maintain corneal energy levels, these individuals should have a greater dependence on glycolytic metabolism, which will lead to greater production of lactic acid. Thus, the hypothesis also predicts that individuals with high Qc will show the greatest drop in corneal pH. Since lactate is the osmotic agent for hypoxic corneal swelling, these individuals will show greater corneal swelling. An alternate hypothesis, that variability in corneal swelling is a function of the variability in endothelial function, will also be tested. If the primary hypothesis is accepted, then further studies will be initiated to determine if individuals with high metabolic demand have a greater propensity toward developing

clinical complications while wearing **contact lenses.** If so, this could lead to the development of a provocative test for suitability of contact lens wear based on a quick and simple measure of corneal oxygen consumption.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CUSTOMIZED CONTACT LENSES**

  Principal Investigator & Institution: Yoon, Guenyoung; Ophthalmology; University of Rochester Orpa - Rc Box 270140 Rochester, NY 14627

  Timing: Fiscal Year 2003; Project Start 02-SEP-2003; Project End 31-AUG-2007

  Summary: (provided by applicant): Wavefront aberrations in the eye's optics degrade vision. These aberrations, including many higher order aberrations that are not corrected by conventional spectacles, are especially severe in patients with keratoconus and in patients who have had penetrating keratoplasty. Accurate measurement and correction of these higher order aberrations could result in substantial improvements in vision. However, little wave aberration data can be obtained from patients with these conditions, primarily because existing wavefront sensors have too small a dynamic range to measure the large aberrations in these eyes. Moreover, even if measurements were available, there are few available therapeutic alternatives. The research objectives of this bioengineering research project are to develop a robust wavefront sensor, with a large dynamic range, that will reliably diagnose the wave aberrations in highly aberrated eyes, and to develop a customized contact lens that can compensate for most of these aberrations. The key to expanding the dynamic range of the wavefront sensor is the use of a translational plate that increases spacing between wavefront sensing spots. The key to developing the contact lens is the use of high-power laser ablation of the contact lens based on the measurements with the wavefront sensor.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: DEVELOPMENT OF NON INVASIVE GLUCOSE SENSING DEVICES**

  Principal Investigator & Institution: Lednev, Igor K.; Sentek Group, Inc. 3321 Shady Ave Pittsburgh, PA 15217

  Timing: Fiscal Year 2001; Project Start 27-JUN-2001; Project End 30-NOV-2001

  Summary: (Scanned from the Applicant's Abstract): The recent Diabetes Control and Complications Trial has clearly demonstrated that glycemic control in patients with diabetes mellitus is crucial. A critical component of intensive diabetes management is accurate and frequent glucose monitoring. However, the current generation of home glucose meters is only accurate to +/- 15 percent, requires a fingerstick for blood sampling, and must be carried as a separate kit everywhere with the patient. The present invasive methodologies show poor patient compliance which translates to negative health consequences for a significant proportion of patients with diabetes mellitus. We will develop a novel, real-time glucose sensor which is minimally invasive (or even by some definitions noninvasive) which will be contained within an outer ridge of a contact lens, or placed within an ocular insert underneath the eyelid. These devices will sense the glucose level in the tear fluid, which has been shown to track the glucose level in blood. The sensing material utilizes a novel polymerized colloidal array (PCCA) material which contains a recognition agent for glucose. The PCCA contains a cubic array of colloidal particles polymerized in a hydrogel. This PCCA diffracts light of a wavelength determined by the array spacing. Exposure to glucose changes the hydrogel volume which results in a change in the array spacing. This alters the diffracted wavelength. The patients will determine their glucose concentrations by looking at their

contact lenses in a mirror; the colors observed will accurately give their glucose concentrations. The work here in this Phase I program will demonstrate proof of concept for this sensor by demonstrating that the glucose sensing PCCA will properly function at the tear fluid glucose concentrations and will not be confounded by other species present in the tear fluid. PROPOSED COMMERCIAL APPLICATION: NOT AVAILABLE

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: GENETIC FACTORS IN KERATOCONUS**

  Principal Investigator & Institution: Rabinowitz, Yaron S.; Professor; Cedars-Sinai Medical Center Box 48750, 8700 Beverly Blvd Los Angeles, CA 90048

  Timing: Fiscal Year 2001; Project Start 01-JAN-1993; Project End 31-DEC-2005

  Summary: (Adapted from applicant's abstract): Keratoconus (KG) is a non-inflammatory thinning disorder of the cornea with an incidence of approximately 1/2000 in the general population. As the etiology of KG is still unknown, there have been no effective therapeutic measures for the treatment of KC other than **contact lenses** and cornea transplantation. Association with rare genetic syndromes, observation of apparent autosomal dominant pedigrees, and results from complex segregation analysis all suggest that the genetic factors may play an important role in the susceptibility of KC. The overall goal of this application is to identify susceptibility genes for KC by (1) more clearly refining our topographic criteria for detecting subclinical KC (KC 'suspects') through longitudinal topographic analysis of our existing cohort of patients and their relatives, (2) recruiting additional KC families suitable for nonparametric linkage analysis, and (3) performing a two stage genome-wide screen with model free linkage and association methods. Specifically, all existing study subjects (-2000) will undergo ocular evaluation and videokeratography over the next 5 years to observe longitudinal and clinical topographic changes in order to examine the relationship of videokeratography variables to biomicroscopic indicators of disease status and to develop more refined criteria for 'mildly affected' (subclinical) KC family members (Aim 1). We will recruit an additional 195 keratoconus families with at least 5 family members available to be phenotyped to provide an independent set of families to confirm the linkage findings from the initial scan (Aim 2). We will employ a two stage genomewide screen approach with two sets of families (initial panel and confirmatory panel) and two levels of markers (initial screen markers and fine mapping markers) to identify chromosomal regions linked to KC. Quantitative videokeratographic indices will be used as primary phenotypes in linkage analysis. After the linked regions are confirmed in the second sample, association studies will be carried out for candidate genes in the linked regions to identify specific susceptibility alleles. Identifying genes contributing to the pathogenesis of KG may provide insights into devising medical therapy to arrest its progression and prevent the need for multiple contact lens changes and/or cornea transplantation in select hiah risk individuals.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: IDENTIFY LIMBAL STEM CELLS BY CELL SURFACE MARKERS**

  Principal Investigator & Institution: Smith, Ronald E.; Professor and Chairman; Doheny Eye Institute 1450 San Pablo St Los Angeles, CA 90033

  Timing: Fiscal Year 2003; Project Start 01-MAR-2003; Project End 28-FEB-2006

  Summary: (provided by applicant): Damage to the limbal epithelial cells can be caused by chemical or thermal burns, the Stevens-Johnson syndrome, ocul cicatrIcial

pemphigoid, **contact lenses,** severe infection, congenital aniridia, pterygium, herpes simplex epithelial disease contact lens induced keratopathy, neuroparalytic keratitis, drug toxicity, or multiple surgical procedures in the corneolim region and may lead to loss of limbal stem cells. The resulting so-called "limbal stem cell deficiency" is manifested by vascularization and chronic inflammation of the cornea, ingrowth of fibrous tissue, ulceration and corneal opacification. Transplantation of limbal tissue, supposedly including stem cells, from the limbus of the contralateral eye (if normal), or from a donor, can restore useful vision by providing stem cells which re-populate the cornea with normal epithelial cells. However, these procedures require large limbal grafts from the patient's healthy fellow eye and are not possible (except from a donor) in patients who have bilateral limbal stem cell deficiency. Using donor stem cells may result in rejection and requires prophylactic immunosuppression. Bioengineered corneal limbal stem cells and autograft tissue derived from the patient could circumvent these problems, but specific cell surface markers for limbal stem cells have not yet been developed. We will be guided by recently published methods, by finding for skin epidermal stem cells and by our preliminary studies. Three specific aims include: 1) identifying cell surface markers for corneal limbal stem cells. 2) establishing primary limbal stem cell cultures and evaluating the markers on cloned limbal stem cells to determine whether they correlate with in vivo stem cell surface markers. 3) isolating identified and marked corneal limbal stem cells using state of the art techniques for non-contact laser micromanipulation of cells, thereby providing a source of limbal stem cells for culture and further study. This work will advance our understanding of corneal limbal stem cell biology and may lead to the development of an RO1 proposal based on our findings. Such a proposal will include studies of the function of limbal stem cells in corneal epithelial healing; in epithelial migration and anchoring to underlying stroma; in differentiation and maturation of stem cells to transient amplifying cells, basal cells, and then mature surface cells; in interacting with recently described conjunctival epithelial stem cells. All such studies have previously been limited by lack of cell surface markers to localize stem cell population.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: IMPROVED SEARCH COIL METHOD FOR MEASURING EYE MOVEMENTS**

  Principal Investigator & Institution: Shelhamer, Mark J.; Associate Professor; Otolaryn & Head & Neck Surgery; Johns Hopkins University 3400 N Charles St Baltimore, MD 21218

  Timing: Fiscal Year 2003; Project Start 30-SEP-2003; Project End 31-JUL-2008

  Summary: (provided by applicant): The investigators will develop a new device for the precise and convenient measurement of eye movements. The device is based on the existing and widely used wired scleral search coil technique, in which an annular contact lens with a small coil of wire is placed on the eye, and its orientation determined from the magnitude of the current induced in the coil by external magnetic fields. The new device uses a similar scleral contact lens on the eye, but the new lens has no wires leading from the eye coil to the associated electronics. Signals are induced in the eye coil, and detected from the eye coil, by a transmitter/receiver near the eye. The orientation of the lens and coil is determined from the received signal. An existing prototype system is the basis for further development of the new system, which will proceed along the following lines: 1) assessment of engineering design options with the existing system; 2) fabrication of new **contact lenses** with the appropriate coils embedded; 3) extension of the system to measure torsional eye movements as well as

horizontal and vertical; 4) packaging as a stand-alone system that can be worn by the subject; 5) assessment of performance by video analysis of eye and lens motion. This new method retains the conventional wired coil's benefits of high resolution and accuracy, large range of movement, and complete three-dimensional measurement of orientation. The largest drawback of the conventional system is the wires that lead from the eye coils to the signal processing electronics. By eliminating these wires, several very significant advantages result. Subject comfort is greatly increased, as the external wiring leading from the eye often irritates the eyelid and causes annoying stimulation of the eyelashes. A greater range of experiments can be performed, since the placement of the head within the external magnetic fields becomes less restrictive; head-free experiments, such as those involving locomotion and self-generated movements become much more practical. Perhaps most importantly, breakage of the external wiring (the most common source of failure in current systems) is avoided. The "wireless" measurement system will be of tremendous benefit to both the research and the clinical communities. In particular, vestibular and oculomotor patients should tolerate the new coils much better than existing ones, allowing easier and more convenient recording of precise eye movements in a larger segment of this population, for whom the conventional coils are often intimidating and uncomfortable.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: IMPROVEMENT OF VISION RESEARCH FACILITY**

  Principal Investigator & Institution: Jones, Ronald; None; Ohio State University 1800 Cannon Dr, Rm 1210 Columbus, OH 43210

  Timing: Fiscal Year 2002; Project Start 01-MAY-2002; Project End 30-APR-2005

  Summary: (provided by applicant): The high award rate from the NEI, National Institutes of Health (NIH) has created a crisis in space allocation for the College of Optometry at The Ohio State University. It is proposed to construct three additional floors on the West Wing of Fry Hall to meet the demand of currently funded and soon-to-be-funded vision research projects. After completion of this construction plan, the net assignable sq. ft. for research at the College of Optometry will increase from its current 10,896 sq. ft. to 24,376 sq. ft. Specific aims of the construction are to: 1) enhance the ability to conduct research, collect research data and to analyze data for patient-oriented research studies; 2) improve the quality of patient interactions with researchers; 3) allow for new funded research projects; 4) provide an environment for attracting new faculty and for retaining active researchers; 5) enhance leadership in children's clinical vision research and in specific focus areas such as vision rehabilitation, eye movements, corneal/tear physiology, and **contact lenses;** 6) allow dedicated clinical research areas for children and adults that do not interfere with educational programs; 7) allow graduate students and research trainees to interact optimally with advisors; 8) promote efficiency and interaction through shared space and equipment; 9) promote efficiency in research subject scheduling and retention; 10) consolidate modules and relieve stress in severely overcrowded research spaces; 11) enhance collaboration by eliminating the current "scattering" of clinical research programs throughout three buildings; and 12) eliminate "inappropriate spaces" and "borrowed educational space" currently utilized by researchers.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: INTEGRATED ASSESSMENT OF CORNEAL FORM AND FUNCTION**

  Principal Investigator & Institution: Klyce, Stephen D.; Professor; Ophthalmology; Louisiana State Univ Hsc New Orleans New Orleans, LA 70112

Timing: Fiscal Year 2002; Project Start 01-JUL-1979; Project End 30-JUN-2006

Summary: (provided by applicant): The cornea is a principal refractive element in the eye; corneal transparency and corneal shape determine its optical qualities. Corneal epithelial edema, stromal edema and corneal shape anomalies can independently or collectively degrade visual performance in the form of increased internal light scatter and optical aberrations due to irregular astigmatism. The central theme of this research proposal is the refinement and application of a mathematical model that integrates the thermodynamic description of corneal epithelial, stromal and endothelial transport properties into a model of corneal hydration control. This is combined with methods to classify shape anomalies and means to assess the optical quality of the corneal surface through the analysis of corneal topography. This investigation will involve both an in vitro model and mathematical models, as well as direct applications to human clinical data, in the following specific aims: 1) Use adaptations of the Klyce and Russell model for corneal hydration dynamics to understand the corneal response to epithelial trauma that evokes the early inflammatory response signaled by transient edema. 2) Refine artificial intelligence methods for the classification and interpretation of corneal topography and ocular wavefront data with emphasis on a device-independent approach. 3) Determine and evaluate numerical constructs to evaluate corneal surface optical quality and ocular wavefront data as they relate to visual acuity in patients. The long-term goal of this project is to integrate corneal metabolic and structural features into a comprehensive model. With this model and the proposed development of new methods for improved and more accurate assessment of the optical performance of the human eye, further progress toward the objective evaluation of the safety and efficacy of current and developing refractive surgical procedures and **contact lenses** can be obtained.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: NEW STERILIZATION METHOD FOR CONTACT LENSES AND CASES**

  Principal Investigator & Institution: Elrod, Don B.; Research Scientist; Lynntech, Inc. College Station, TX 77840

  Timing: Fiscal Year 2003; Project Start 01-SEP-2003; Project End 31-AUG-2004

  Summary: (provided by applicant): **Contact lenses** (CLs) are a successful form of vision control, and the number of people wearing CLs has swelled to 85 million worldwide-32 million nationwide. Many CL wearers are unaware of the potential risks. The most serious complication of CL wear is sight threatening corneal ulceration caused by microbial keratitis (MK). An estimated 30,000 cases of MK occur annually in the US. The use of CLs, especially extended wear lenses, is a significant risk factor for MK. The American Academy of Ophthalmology states, "High prevalence of inadequate CL disinfection, CL storage-case contamination, and contaminated CL solutions among CL users have been reported .' To reduce the risk of CL-associated MK, improvements in tens care products and users compliance with recommend lens care regimes are desperately needed. Only 25-35 percent of CL wearers follow all of their recommended lens care instructions. A new sterilization method is proposed for CLs and lens cases that should improve patient compliance by simplifying their lens care regime and offer significant advantages over current disinfectants-at two orders of magnitude lower concentration the proposed biocide is more effective than hydrogen peroxide against a broader range of organisms.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: NEW TREATMENT FOR AMOEBIC KERATITIS**

  Principal Investigator & Institution: Villemez, Clarence L.; Molecular Biology; University of Wyoming Box 3355, University Station Laramie, WY 82071

  Timing: Fiscal Year 2001; Project Start 01-JUL-1999; Project End 30-JUN-2002

  Summary: (Adapted from the applicant's abstract): Acanthamoebic keratitis is an infection of the cornea that is sight threatening. The infective organisms are widely distributed in the United States environment, but are relatively ineffective pathogens. Unlike disseminated Acanthamoeba infections, which are life threatening and occur in patients with compromised immune systems, acanthamoebic keratitis patients appear to be otherwise healthy. **Contact lenses** appear to increase the probability of contracting the infection. Existing treatment is not sufficiently effective. Even in those cases successfully treated, the disease course is excessively prolonged and involves much pain and loss of vision. This research will investigate the characteristic of Acanthamoeba that appears to determine its opportunistic pathogen property with the aim of developing new therapies. The life cycle of Acanthamoeba, like many important pathogens, includes a dormant form. The putative receptors with which spores and cysts must maintain communication with the extracellular environment are natural focus points for disease prophylaxis and treatment. Yet, except for what is described here, no other receptor of this type has been identified, even from the most studied systems, bacterial spore germination. They have identified a receptor, ESP, which controls absolutely the encystment and excystment of Acanthamoeba castellanii and, consequently, cell division. They also possess four monoclonal antibodies, which react with different epitopes of ESP. Synergy experimentation suggests that ESP is an osmolarity monitor. Anti-ESP bivalent antibodies mimic the natural stimulus for differentiation, causing the organism to cease dividing. The latter characteristic is apparently why Acanthamoeba are poor pathogens. Exploiting this circumstance should easily provide quick and effective therapies for Acanthamoeba pathologies. Experiments will be prepared to extend the ESP/osmolarity receptor results to acanthamoebic keratitis pathogens. They will isolate and sequence the ESP gene from Acanthamoeba castellanii. With polynucleotide probes prepared using the latter information, they will first identify, then isolate, sequence, and employ the homologous genes from pathogenic strains of Acanthamoeba to obtain reasonable quantities of ESP homologs. These proteins, anti-ESP antibodies, and should it prove advantageous, portions of the cDNA, will be used to confer therapeutic immunity. The therapeutic testing will employ the excellent animal models of acanthamoebic keratitis at the University of Texas Southwestern Medical Center, Dallas and the in vivo experiments will be done there.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: OBJECTIVE ASSESSMENT OF SUPPRESSION IN AMBLYOPIA**

  Principal Investigator & Institution: Mckee, Suzanne P.; Associate Director; Smith-Kettlewell Eye Research Institute Research Institute San Francisco, CA 94115

  Timing: Fiscal Year 2002; Project Start 01-SEP-2002; Project End 30-JUN-2004

  Summary: (provided by applicant): We will design an objective test, based on the Visual Evoked Potential (VEP), to measure amblyopic suppression. Our basic tool is the VEP monocular response to periodic vernier onset/offset transitions in bar stimuli, and its suppression during dichoptic stimulation with matching contours. What is unique about this approach is that it identifies which eye is being suppressed as well as the visual acuity of each eye. Although we will develop and validate this test in adult subjects, our dichoptic visual display system has been specifically designed for ultimate use with

infants and pre-verbal children. We also will use a new multi-channel recording system (Geodesic Sensor Net) to explore the neural basis for the differences between normal and abnormal binocular processing. About 4% of all children suffer from strabismus and/or anisometropia during early development. These abnormalities place an individual at risk for a variety of visual deficiencies. The most serious outcome is amblyopia in one eye. Amblyopia refers to a loss of visual acuity, without obvious organic cause, that cannot be corrected by wearing spectacles or **contact lenses.** Perhaps one third of strabismics and anisometropes suffer some loss in visual acuity. The proposed test could assist with the diagnosis of amblyopia in infancy, as well as in monitoring progress during treatment, thereby improving the chance of a favorable outcome.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: OCULAR INSERT FOR THE TREATMENT OF GLAUCOMA**

  Principal Investigator & Institution: Leahy, Charles D.; Vista Scientific, Llc 1 Dundee Pk, Ste 8B Andover, MA 01810

  Timing: Fiscal Year 2001; Project Start 01-APR-2001; Project End 31-OCT-2001

  Summary: A tailored polymer matrix as made representative of the partially expanded inferior conjunctival sac will provide far better controlled drug dose delivery than **contact lenses** or eye drops, and will minimize the expulsion and discomfort problems of previous ocular insert products for the treatment of chronic glaucoma. This larger yet more comfortable design could retain a larger reservoir of the glaucoma drug, timolol, contact a larger tissue area, and be worn effectively for extended periods measured in weeks or months rather than hours or days. This would reduce the significant problems of noncompliance and side effects of conventional eye drop therapy for the treatment of glaucoma. The specific aims of Phase I of the proposed research are to: 1. Cast four representative polypropylene glycol containing polymeric networks of varying hydrophobicity. 2. Characterize the prepared polymer matrices with respect to hydrophilic/hydrophobic nature via solvent swell measurements. 3. Determine the release kinetics of timolol maleate from the four prepared polymeric matrices into buffer solution 4. Define a prototype design for a polymeric insert of the human inferior conjunctival sac. PROPOSED COMMERCIAL APPLICATION: NOT AVAILABLE

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: ROLE OF ADHERENCE IN KERATITIS**

  Principal Investigator & Institution: Gilmore, Michael S.; Vice President for Research; Ophthalmology; University of Oklahoma Hlth Sciences Ctr Health Sciences Center Oklahoma City, OK 73126

  Timing: Fiscal Year 2001; Project Start 01-SEP-1999; Project End 31-AUG-2003

  Summary: Infectious ulcerative keratitis is one of the most common bacterial infectious diseases of the eye, with tens of thousands of cases being treated annually in the U.S. An increase in the incidence of infectious keratitis has been associated with the increased use of **contact lenses;** and new refractive therapies that disrupt corneal surface integrity, a key step in the pathogenesis of infectious keratitis, have recently gained approval. Relatively little is known of the pathogenesis of Staphylococcus aureus keratitis, one of the most common etiologies of the disease. Preliminary studies indicate that surface proteins contribute to the attachment of S. aureus to human corneal epithelial cells in vitro, and that the binding of S. aureus to these cells is effected by proteins negatively regulated by the staphylococcal global regulatory systems, agr and sar. Removal of S.

aureus surface proteins by protease treatment significantly reduces corneal epithelial cell binding. Moreover, preliminary results indicate that mutants in select surface proteins exhibit reduced binding, but not reduced to the extent of protease-treated staphylococci. These results suggest that binding is likely a multifactorial process mediated by as yet unidentified adhesin combinations or other surface factors. We propose to identify the staphylococcal corneal adhesins by assessing the relative binding of isogenic mutants in an in vitro model, using a newly developed fluorescence-based binding assay, with an independent reassessment and confirmation in vivo. A modified signature tagged mutagenesis system will also be used to identify mutants selectively unable to bind human corneal epithelial cells. Complementation will be used to confirm that reductions in binding are the direct result of the corresponding mutation. We also propose to explore the contribution of the host to staphylococcal corneal adherence by identifying corneal receptors involved in staphylococcal adherence and examining cytokine and cellular adhesin expression in response to staphylococcal binding. Finally, keratitis clinical isolates will be compared at the genetic level (by CHEF genomic analysis and PCR identification of putative virulence genes) to determine whether strains associated with corneal disease represent subsets of the species.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: SHACK-HARTMAN CORNEAL TOPOGRAPHER AND ABERROMETER**

  Principal Investigator & Institution: Thibos, Larry N.; Professor; Quarrymen Optical, Inc. 1809 Windsor Dr, Ste a Bloomington, IN 47401

  Timing: Fiscal Year 2002; Project Start 01-MAY-2002; Project End 30-APR-2003

  Summary: (provided by applicant): The long-term objective of our project is to design, build, and market an ophthalmic instrument that simultaneously measures corneal topography and optical aberrations of the human eye using wavefront sensing technology. From these measurements our instrument will provide a complete description of the refractive properties of the anterior cornea, the whole eye, and (by inference the crystalline lens. This optical description will include not only the routine refractive errors of defocus and astigmatism normally measured by present-day optometers and corneal topographers, but will also determine the irregular, higher-order optical aberrations which characterize optically abnormal eyes. Feasibility of the aberrometer component of this dual instrument was proven in a previous STTR grant. The purpose of this Phase-I proposal is to demonstrate feasibility of the corneal topography component by building and testing a prototype instrument using core technology developed with previous STTR support. The major technological advantages of using wavefront sensing technology for corneal topography include: (1) improved performance compared to Placido disk technology, (2) novel assessment of the optical aberrations of the crystalline lens, (3) novel assessment of tear film and keratoconic irregularities, (4) space- and cost-effectiveness derived from application of a single core technology to replace multiple instruments. A combined topographer! aberrometer will help provide wavefront-guided prescriptions for aberration corrections based on inter-ocular lenses, corneal photo-ablative surgery, or **contact lenses.** The long-term benefits will be improved patient care through improved diagnosis and treatment of optical defects of eyes. PROPOSED COMMERCIAL APPLICATION: Acorneal topographer is a clinical instrument used to map the surface geometry of the cornea of a human eye. Our design of a corneal topographer is based on wavefront sensing technology which has numerous advantages: lower cost, better accuracy, and integrated design with

ophthalmic aberrometers. The same basic design concept could also be used to measure surfaces of lenses and mirrors in the optics industry.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: STUDIES OF THE CORNEA**

  Principal Investigator & Institution: Bourne, William M.; Mayo Clinic Rochester 200 1St St Sw Rochester, MN 55905

  Timing: Fiscal Year 2003; Project Start 01-AUG-1978; Project End 31-AUG-2008

  Summary: (provided by applicant): This grant application is to support a study of the long-term effects on corneal transparency of the two most common surgical procedures on the central cornea in the U.S., corneal transplantation and excimer laser refractive surgery, the former to restore useful vision to abnormal corneas and the latter to eliminate the need for glasses or **contact lenses** in otherwise normal corneas. In previous studies we identified in long-term corneal transplants a loss of transparency called "late endothelial failure" that causes over 90% of graft failures after 5 years. These grafts have greatly decreased numbers of endothelial cells, keratocytes, and nerves, and the loss of transparency in late endothelial failure is associated with insufficient keratocytes rather than purely endothelial decompensation. In recent studies we found that after laser refractive surgery corneas had conditions in part similar to those of the transplanted corneas, i.e., decreased anterior keratocytes and nerves, for at least 3 years (our longest follow-up). The long-term effects of these keratocyte and nerve deficits after laser refractive surgery are of concern and have not been studied. This research plan will investigate the long-term effects of these cellular and nerve deficits on the human cornea: changes in corneal transparency that produce late endothelial failure after corneal transplantation, and potential long-term changes in corneal transparency and topography after laser refractive surgery. These will necessarily be clinical studies. We plan to study 100 patients (20 per year) with long-term corneal transplants. We will also study 20 patients after photorefractive keratectomy (PRK), 20 patients after laser-assisted in situ keratomileusis (LASIK), and 20 age-matched control patients, all for 4 years. For effects 5-9 years after surgery, we will study 15 PRK and 15 LASIK patients from our past investigations at 5, 7, and 9 years after surgery. We will also investigate in the laboratory new methods to prevent or delay late endothelial failure by using human corneas ex vivo. One central theme guides our research endeavors: The pathophysiologic effects of surgery on the central cornea can be discovered by careful prospective observation. Knowledge of these effects will lead to improvements in these surgical procedures.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

E-Journals: PubMed Central[3]

PubMed Central (PMC) is a digital archive of life sciences journal literature developed and managed by the National Center for Biotechnology Information (NCBI) at the U.S. National Library of Medicine (NLM).[4] Access to this growing archive of e-journals is free and

[3] Adapted from the National Library of Medicine: **http://www.pubmedcentral.nih.gov/about/intro.html**.

[4] With PubMed Central, NCBI is taking the lead in preservation and maintenance of open access to electronic literature, just as NLM has done for decades with printed biomedical literature. PubMed Central aims to become a world-class library of the digital age.

unrestricted.[5] To search, go to **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Pmc**, and type "contact lenses" (or synonyms) into the search box. This search gives you access to full-text articles. The following is a sample of items found for contact lenses in the PubMed Central database:

- **18S Ribosomal DNA Typing and Tracking of Acanthamoeba Species Isolates from Corneal Scrape Specimens, Contact Lenses, Lens Cases, and Home Water Supplies of Acanthamoeba Keratitis Patients in Hong Kong.** by Booton GC, Kelly DJ, Chu YW, Seal DV, Houang E, Lam DS, Byers TJ, Fuerst PA. 2002 May; http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&rendertype=external&artid=130944
- **Bacterial Colonization of Disposable Soft Contact Lenses Is Greater during Corneal Infiltrative Events than during Asymptomatic Extended Lens Wear.** by Sankaridurg PR, Sharma S, Willcox M, Naduvilath TJ, Sweeney DF, Holden BA, Rao GN. 2000 Dec; http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&rendertype=external&artid=87615

The National Library of Medicine: PubMed

One of the quickest and most comprehensive ways to find academic studies in both English and other languages is to use PubMed, maintained by the National Library of Medicine.[6] The advantage of PubMed over previously mentioned sources is that it covers a greater number of domestic and foreign references. It is also free to use. If the publisher has a Web site that offers full text of its journals, PubMed will provide links to that site, as well as to sites offering other related data. User registration, a subscription fee, or some other type of fee may be required to access the full text of articles in some journals.

To generate your own bibliography of studies dealing with contact lenses, simply go to the PubMed Web site at **http://www.ncbi.nlm.nih.gov/pubmed**. Type "contact lenses" (or synonyms) into the search box, and click "Go." The following is the type of output you can expect from PubMed for contact lenses (hyperlinks lead to article summaries):

- **A 1-year prospective clinical trial of balafilcon a (PureVision) silicone-hydrogel contact lenses used on a 30-day continuous wear schedule.**
  Author(s): Brennan NA, Coles ML, Comstock TL, Levy B.
  Source: Ophthalmology. 2002 June; 109(6): 1172-7.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12045062&dopt=Abstract

[5] The value of PubMed Central, in addition to its role as an archive, lies in the availability of data from diverse sources stored in a common format in a single repository. Many journals already have online publishing operations, and there is a growing tendency to publish material online only, to the exclusion of print.

[6] PubMed was developed by the National Center for Biotechnology Information (NCBI) at the National Library of Medicine (NLM) at the National Institutes of Health (NIH). The PubMed database was developed in conjunction with publishers of biomedical literature as a search tool for accessing literature citations and linking to full-text journal articles at Web sites of participating publishers. Publishers that participate in PubMed supply NLM with their citations electronically prior to or at the time of publication.

- **A 1-year prospective clinical trial of menicon Z (tisilfocon A) rigid gas-permeable contact lenses worn on a 30-day continuous wear schedule.**
  Author(s): Gleason W, Tanaka H, Albright RA, Cavanagh HD.
  Source: Eye Contact Lens. 2003 January; 29(1): 2-9.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12769147&dopt=Abstract

- **A 20-year retrospective study of the use of contact lenses in keratoconus.**
  Author(s): Kastl PR, Donzis PB, Cole HP 3rd, Rice J, Baldone JA.
  Source: Clao J. 1987 March-April; 13(2): 102-4. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3329071&dopt=Abstract

- **A 3-year prospective study of the clinical performance of daily disposable contact lenses compared with frequent replacement and conventional daily wear contact lenses.**
  Author(s): Solomon OD, Freeman MI, Boshnick EL, Cannon WM, Dubow BW, Kame RT, Lanier JC Jr, Lopanik RW, Quinn TG, Rigel LE, Sherrill DD, Stiegmeier MJ, Teiche RS, Zigler LG, Mertz GW, Nason RJ.
  Source: Clao J. 1996 October; 22(4): 250-7.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8906382&dopt=Abstract

- **A 3-year study on the effect of RGP contact lenses on myopic children.**
  Author(s): Khoo CY, Chong J, Rajan U.
  Source: Singapore Med J. 1999 April; 40(4): 230-7.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10487074&dopt=Abstract

- **A clinical evaluation of frequent replacement contact lenses on patients currently wearing premium reusable daily wear soft contact lenses.**
  Author(s): Nason RJ, Vogel H, Tarbell BJ, Yi FP, Mertz GW.
  Source: J Am Optom Assoc. 1993 March; 64(3): 188-95.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8454836&dopt=Abstract

- **A clinical evaluation of two multifocal soft contact lenses.**
  Author(s): Gussler CH, Solomon KD, Gussler JR, Litteral G, Van Meter WS.
  Source: Clao J. 1992 October; 18(4): 237-9.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1424058&dopt=Abstract

- **A comparison between nomogram vs. trial fitting of rigid gas permeable contact lenses.**
  Author(s): Postma JT, Postma AM, Schnider CM.
  Source: J Am Optom Assoc. 1993 April; 64(4): 258-63.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8315202&dopt=Abstract

- **A comparison of conventional and disposable extended wear contact lenses.**
  Author(s): Boswall GJ, Ehlers WH, Luistro A, Worrall M, Donshik PC.
  Source: Clao J. 1993 July; 19(3): 158-65.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8375036&dopt=Abstract

- **A comparison of the size of the burn produced by Rodenstock and Goldmann contact lenses.**
  Author(s): Reddy VM, Zamora R, Olk RJ.
  Source: Am J Ophthalmol. 1991 August 15; 112(2): 212-4. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1867311&dopt=Abstract

- **A comparison of the use of an ATP-based bioluminescent assay and image analysis for the assessment of bacterial adhesion to standard HEMA and biomimetic soft contact lenses.**
  Author(s): Andrews CS, Denyer SP, Hall B, Hanlon GW, Lloyd AW.
  Source: Biomaterials. 2001 December; 22(24): 3225-33.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11700794&dopt=Abstract

- **A European fitting philosophy for aspheric, high-Dk RGP contact lenses.**
  Author(s): Kok JH.
  Source: Clao J. 1992 October; 18(4): 232-6. Review.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1424057&dopt=Abstract

- **A laboratory model to determine the uptake and release of olopatadine by soft contact lenses.**
  Author(s): Dassanayake NL, Carey TC, Owen GR.
  Source: Acta Ophthalmol Scand Suppl. 2000; (230): 16-7. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11057343&dopt=Abstract

- **A model of oxygen flux through contact lenses.**
  Author(s): Brennan NA.
  Source: Cornea. 2001 January; 20(1): 104-8.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11188991&dopt=Abstract

- **A new matrix formulation of spectacle magnification using pupil magnification. II and III: High myopia corrected with contact lenses and intraocular lenses.**
  Author(s): Garcia M, Gonzalez C, Pascual I.
  Source: Ophthalmic Physiol Opt. 1996 November; 16(6): 498-506.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8944197&dopt=Abstract

- **A nomogram for fitting fluorosilicone acrylate contact lenses.**
  Author(s): Harrison K, Stein HA.
  Source: Clao J. 1988 July-September; 14(3): 136-8.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3208427&dopt=Abstract

- **A novel procedure for the extraction of protein deposits from soft hydrophilic contact lenses for analysis.**
  Author(s): Keith D, Hong B, Christensen M.
  Source: Curr Eye Res. 1997 May; 16(5): 503-10.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9154390&dopt=Abstract

- **A practical approach to and long-term results of fitting silicone contact lenses in aphakic children after congenital cataract.**
  Author(s): de Brabander J, Kok JH, Nuijts RM, Wenniger-Prick LJ.
  Source: Clao J. 2002 January; 28(1): 31-5.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11842819&dopt=Abstract

- **A prospective evaluation of Unilens soft multifocal contact lenses in 100 patients.**
  Author(s): Shapiro MB, Bredeson DC.
  Source: Clao J. 1994 July; 20(3): 189-91.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7955300&dopt=Abstract

- **A randomized trial of rigid gas permeable contact lenses to reduce progression of children's myopia.**
  Author(s): Katz J, Schein OD, Levy B, Cruiscullo T, Saw SM, Rajan U, Chan TK, Yew Khoo C, Chew SJ.
  Source: Am J Ophthalmol. 2003 July; 136(1): 82-90.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12834674&dopt=Abstract

- **A relatively small change in sodium chloride concentration has a strong effect on adhesion of ocular bacteria to contact lenses.**
  Author(s): Cowell BA, Willcox MD, Schneider RP.
  Source: J Appl Microbiol. 1998 June; 84(6): 950-8.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9717279&dopt=Abstract

- **A review of complications associated with soft contact lenses.**
  Author(s): Arentsen JJ.
  Source: J Ophthalmic Nurs Technol. 1987 November-December; 6(6): 230-3. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3694684&dopt=Abstract

- **A review of relative risks associated with four types of contact lenses.**
  Author(s): Bailey CS.
  Source: Cornea. 1990; 9 Suppl 1: S59-61; Discussion S62-3.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2347200&dopt=Abstract

- **A study of the complications induced by conventional and disposable contact lenses.**
  Author(s): Hamano H, Watanabe K, Hamano T, Mitsunaga S, Kotani S, Okada A.
  Source: Clao J. 1994 April; 20(2): 103-8.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8044974&dopt=Abstract

- **A survey of U.S. Air Force flyers regarding their use of extended wear contact lenses.**
  Author(s): Moore RJ, Green RP Jr.
  Source: Aviat Space Environ Med. 1994 November; 65(11): 1025-31.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7840742&dopt=Abstract

- **A technique for quantitation of protein deposits on rigid gas permeable contact lenses.**
  Author(s): Tan A, Milthorpe BK, Huff JW.
  Source: Clao J. 1997 July; 23(3): 177-84.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9240829&dopt=Abstract

- **A unifying parameter to describe the clinical mechanics of hydrogel contact lenses.**
  Author(s): Martin DK, Boulos J, Gan J, Gavriel K, Harvey P.
  Source: Optom Vis Sci. 1989 February; 66(2): 87-91.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2710515&dopt=Abstract

- **Aberration generation by contact lenses with aspheric and asymmetric surfaces.**
  Author(s): Lopez-Gil N, Castejon-Mochon JF, Benito A, Marin JM, Lo-a-Foe G, Marin G, Fermigier B, Renard D, Joyeux D, Chateau N, Artal P.
  Source: J Refract Surg. 2002 September-October; 18(5): S603-9.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12361166&dopt=Abstract

- **Aberrations associated with rigid contact lenses.**
  Author(s): Atchison DA.
  Source: J Opt Soc Am A. 1995 October; 12(10): 2267-73.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7500208&dopt=Abstract

- **Acanthamoeba adherence to contact lenses and removal by cleaning agents.**
  Author(s): Kilvington S, Larkin DF.
  Source: Eye. 1990; 4 (Pt 4): 589-93.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2226989&dopt=Abstract

- **Acanthamoeba and disinfection of soft contact lenses.**
  Author(s): Meisler DM, Rutherford I.
  Source: Rev Infect Dis. 1991 March-April; 13 Suppl 5: S410-2. Review.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2047676&dopt=Abstract

- **Acanthamoeba keratitis associated with contact lenses: six consecutive cases of successful management.**
  Author(s): Moore MB, McCulley JP.
  Source: Br J Ophthalmol. 1989 April; 73(4): 271-5.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2540794&dopt=Abstract

- **Acanthamoeba keratitis associated with contact lenses; report of three cases in Italy.**
  Author(s): Mancino R, Iori A, Palma S, Corsi A, Cancrini G, Cerulli L.
  Source: Parassitologia. 1997 March; 39(1): 37-40.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9419845&dopt=Abstract

- **Acanthamoeba keratitis associated with disposable contact lenses.**
  Author(s): Heidemann DG, Verdier DD, Dunn SP, Stamler JF.
  Source: Am J Ophthalmol. 1990 December 15; 110(6): 630-4.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2248326&dopt=Abstract

- **Acanthamoeba keratitis in Tennessee: a growing problem in patients wearing contact lenses.**
  Author(s): Johns KJ, Parrish CM, Seal MR, Jerkins GW, Berrie WR, Litchford DW, Sullivan WR, Boone JE, Elliott JH, O'Day DM.
  Source: J Tenn Med Assoc. 1989 November; 82(11): 584-8.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2622154&dopt=Abstract

- **Acanthamoeba keratitis, contact lenses, and the potential health implications of global marketing.**
  Author(s): Hay J, Seal DV.
  Source: Trans R Soc Trop Med Hyg. 1996 May-June; 90(3): 331. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8758097&dopt=Abstract

- **Acanthamoeba spp., antimicrobial agents and contact lenses.**
  Author(s): Turner NA, Russell AD, Furr JR, Lloyd D.
  Source: Sci Prog. 1999; 82 (Pt 1): 1-8. Review. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10445006&dopt=Abstract

- **Acanthoamoeba attachment to contact lenses.**
  Author(s): Perilli R, Marziano ML, Formisano G, Caiazza S, Scorcia G, Baldassarri L.
  Source: Ophthalmology. 2001 May; 108(5): 837. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11320007&dopt=Abstract

- **Acceptance of different multifocal contact lenses depending on the binocular findings.**
  Author(s): Cagnolati W.
  Source: Optom Vis Sci. 1993 April; 70(4): 315-22.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8502460&dopt=Abstract

- **Accuracy of intraocular pressure measurements with two different tonometers through bandage contact lenses.**
  Author(s): Mark LK, Asbell PA, Torres MA, Failla SJ.
  Source: Cornea. 1992 July; 11(4): 277-81.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1424645&dopt=Abstract

- **Actual wearing time vs. possession time of contact lenses.**
  Author(s): Schoessler JP.
  Source: Optom Vis Sci. 1989 April; 66(4): 196-201.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2726161&dopt=Abstract

- **Adaptive effects of 30-night wear of hyper-O(2) transmissible contact lenses on bacterial binding and corneal epithelium: a 1-year clinical trial.**
  Author(s): Ren DH, Yamamoto K, Ladage PM, Molai M, Li L, Petroll WM, Jester JV, Cavanagh HD.
  Source: Ophthalmology. 2002 January; 109(1): 27-39; Discussion 39-40.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11772575&dopt=Abstract

- **Adherence of Acanthamoeba castellanii cysts and trophozoites to unworn soft contact lenses.**
  Author(s): John T, Desai D, Sahm D.
  Source: Am J Ophthalmol. 1989 December 15; 108(6): 658-64.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2596545&dopt=Abstract

- **Adherence of Pseudomonas aeruginosa to hydrophilic contact lenses and other substrata.**
  Author(s): Miller MJ, Ahearn DG.
  Source: J Clin Microbiol. 1987 August; 25(8): 1392-7.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3114317&dopt=Abstract

- **Adherence of viable and nonviable bacteria to soft contact lenses.**
  Author(s): John T, Refojo MF, Hanninen L, Leong FL, Medina A, Kenyon KR.
  Source: Cornea. 1989; 8(1): 21-33.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2494020&dopt=Abstract

- **Adhesion and growth of Serratia marcescens on artificial closed eye tears soaked hydrogel contact lenses.**
  Author(s): Hume EB, Willcox MD.
  Source: Aust N Z J Ophthalmol. 1997 May; 25 Suppl 1: S39-41.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9267622&dopt=Abstract

- **Advanced manual lensometry: a self-learning guide for evaluating multifocal and specialty lenses, progressive lenses, prisms, and rigid contact lenses.**
  Author(s): Garber N.
  Source: J Ophthalmic Nurs Technol. 2000 September-October; 19(5): 240-7; Quiz 248-9.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11933321&dopt=Abstract

- **Advancements in extended-wear contact lenses.**
  Author(s): Freeman ME.
  Source: Ophthalmologica. 2001; 215 Suppl 1: 35-46; Discussion 47-54. Review. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11276897&dopt=Abstract

- **Air-drying contact lenses.**
  Author(s): Elmstrom G.
  Source: J Am Optom Assoc. 1996 June; 67(6): 315. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8888850&dopt=Abstract

- **Allergic conjunctivitis and contact lenses: experience with olopatadine hydrochloride 0.1% therapy.**
  Author(s): Brodsky M.
  Source: Acta Ophthalmol Scand Suppl. 2000; (230): 56-9.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11057353&dopt=Abstract

- **Amebic keratitis in a wearer of disposable contact lenses due to a mixed Vahlkampfia and Hartmannella infection.**
  Author(s): Aitken D, Hay J, Kinnear FB, Kirkness CM, Lee WR, Seal DV.
  Source: Ophthalmology. 1996 March; 103(3): 485-94.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8600427&dopt=Abstract

- **An alternative approach to bandage contact lenses.**
  Author(s): Gupta S, Arora R, Dass Sota L, Kumar M.
  Source: Clao J. 1998 April; 24(2): 118-21.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9571273&dopt=Abstract

- **An analysis of nodular deposits on soft contact lenses.**
  Author(s): Begley CG, Waggoner PJ.
  Source: J Am Optom Assoc. 1991 March; 62(3): 208-14.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1813524&dopt=Abstract

- **An evaluation of four multifocal contact lenses in young monocular aphakic patients.**
  Author(s): Conklin JD Jr, Litteral G, Schmeisser ET, Van Meter WS.
  Source: Clao J. 1992 April; 18(2): 92-4.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1606680&dopt=Abstract

- **An in vivo comparison of the kinetics of protein and lipid deposition on group II and group IV frequent-replacement contact lenses.**
  Author(s): Jones L, Fcoptom, Mann A, Evans K, Franklin V, Tighe B.
  Source: Optom Vis Sci. 2000 October; 77(10): 503-10.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11100888&dopt=Abstract

- **Analysis of glycoprotein deposits on disposable soft contact lenses.**
  Author(s): Tripathi PC, Tripathi RC.
  Source: Invest Ophthalmol Vis Sci. 1992 January; 33(1): 121-5.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1730532&dopt=Abstract

- **Aniseikonia measurement by phase difference haploscope in myopic anisometropia and unilateral aphakia (with special reference to Knapp's law and comparison between correction with spectacle lenses and contact lenses). 1971.**
  Author(s): Awaya S, von Noorden GK.
  Source: Binocul Vis Strabismus Q. 1999 Fall; 14(3): 223-30. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10553116&dopt=Abstract

- **Annular tinted contact lenses caused irregular corneal astigmatism.**
  Author(s): Hunt L.
  Source: Insight. 2000 January-March; 25(1): 16-7. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11907889&dopt=Abstract

- **Anxiety induced by contact lenses and framed spectacles.**
  Author(s): Terry RL, Zimmerman DJ.
  Source: J Am Optom Assoc. 1970 March; 41(3): 257-9. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=5424652&dopt=Abstract

- **Application of contact lenses after the operation of cataract.**
  Author(s): Kyo S, Ishii N.
  Source: Kaiin Dayori Nippon Kontakuto Renzu Gakkai. 1969; 11: Suppl: 73. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=5389029&dopt=Abstract

- **Applications of hydrophilic disposable contact lenses as therapeutic bandages.**
  Author(s): Lindahl KJ, DePaolis MD, Aquavella JV, Temnycky GO, Erdey RA.
  Source: Clao J. 1991 October; 17(4): 241-3.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1764769&dopt=Abstract

- **Applications of Raman spectroscopy to ophthalmology: spectroscopic characterization of disposable soft contact lenses.**
  Author(s): Monti P, Simoni R, Caramazza R, Bertoluzza A.
  Source: Biospectroscopy. 1998; 4(6): 413-9.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9851722&dopt=Abstract

- **Ask the doctor: I just got a new pair of soft contact lenses. They are very comfortable, and my ophthalmologist told me I can keep them in for a week. I'd like to wear them all the time, but I'm not sure it's safe. What do you think?**
  Author(s): Simon HB.
  Source: Harv Mens Health Watch. 2000 February; 4(7): 8. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10637027&dopt=Abstract

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  Author(s): O'Neill DP, Matheson MM.
  Source: Eye. 1991; 5 (Pt 5): 612-4.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1794429&dopt=Abstract

- **Water pervaporation through silicone rubber contact lenses: a possible cause of complications.**
  Author(s): Refojo MF, Leong FL.
  Source: Contact Intraocul Lens Med J. 1981 July-September; 7(3): 226-33. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7338053&dopt=Abstract

- **Wearing contact lenses during sleep: corneal curvature changes.**
  Author(s): Rengstorff RH.
  Source: Am J Optom Arch Am Acad Optom. 1971 December; 48(12): 1034-7. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=5289479&dopt=Abstract

- **Wearing contact lenses in space shuttle operations.**
  Author(s): Hart LG.
  Source: Aviat Space Environ Med. 1985 December; 56(12): 1224-5.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3866574&dopt=Abstract

- **Wet storage of contact lenses. Disposable soaking-solution capsules and semidisposable lens cases.**
  Author(s): Krishna N.
  Source: Am J Ophthalmol. 1966 June; 61(6): 1538. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=5938326&dopt=Abstract

- **Wetting of contact lenses.**
  Author(s): Rankin BF, Trager SF.
  Source: Am J Optom Arch Am Acad Optom. 1970 September; 47(9): 698-702. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=5273342&dopt=Abstract

- **What about extended-wear soft contact lenses?**
  Author(s): Gunby P.
  Source: Jama. 1979 November 9; 242(19): 2053-4. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=490780&dopt=Abstract

- **What lens is that new patient wearing? Identifying, inspecting, and verifying the parameters of rigid and soft contact lenses.**
  Author(s): Rakow PL.
  Source: J Ophthalmic Nurs Technol. 2000 November-December; 19(6): 304-10. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11933523&dopt=Abstract

- **What you've always wanted to know about contact lenses and were afraid to ask.**
  Author(s): Stein GB.
  Source: J Am Optom Assoc. 1977 March; 48(3): 284-93 Contd. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=864183&dopt=Abstract

- **What you've always wanted to know about contact lenses and were afraid to ask. Interview by Gerald B.M. Stein.**
  Author(s): Bayshore CA, Brungardt TF, Goodlaw E, Koetting RA, Morrison R.
  Source: J Am Optom Assoc. 1975 November; 46(11): 1108-14. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1078397&dopt=Abstract

- **What's new in contact lenses?**
  Author(s): Rakow PL.
  Source: J Ophthalmic Nurs Technol. 1985 March-April; 4(2): 14-20. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3845125&dopt=Abstract

- **Which lens: contact lenses currently available for extended wear in aphakia.**
  Author(s): Aquavella JV, Rao GN.
  Source: Ophthalmology. 1980 February; 87(2): 151-4.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7383543&dopt=Abstract

- **Wide-angle retinal photography using contact lenses.**
  Author(s): Aan de Kerk A, Steenbergen EJ.
  Source: J Audiov Media Med. 1981 October; 4(4): 139-40. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7328266&dopt=Abstract

- **Will young children comply and follow instructions to successfully wear soft contact lenses?**
  Author(s): Soni PS, Horner DG, Jimenez L, Ross J, Rounds J.
  Source: Clao J. 1995 April; 21(2): 86-92.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7796526&dopt=Abstract

- **Xanthomonas maltophilia keratitis associated with contact lenses.**
  Author(s): Spraul CW, Lang GE, Lang GK.
  Source: Clao J. 1996 July; 22(3): 158. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8828930&dopt=Abstract

- **XPS and surface-MALDI-MS characterisation of worn HEMA-based contact lenses.**
  Author(s): McArthur SL, McLean KM, St John HA, Griesser HJ.
  Source: Biomaterials. 2001 December; 22(24): 3295-304.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11700801&dopt=Abstract

- **You can't wear contact lenses.**
  Author(s): Potter JW.
  Source: J Am Optom Assoc. 1992 March; 63(3): 160. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1583272&dopt=Abstract

CHAPTER 2. NUTRITION AND CONTACT LENSES

Overview

In this chapter, we will show you how to find studies dedicated specifically to nutrition and contact lenses.

Finding Nutrition Studies on Contact Lenses

The National Institutes of Health's Office of Dietary Supplements (ODS) offers a searchable bibliographic database called the IBIDS (International Bibliographic Information on Dietary Supplements; National Institutes of Health, Building 31, Room 1B29, 31 Center Drive, MSC 2086, Bethesda, Maryland 20892-2086, Tel: 301-435-2920, Fax: 301-480-1845, E-mail: ods@nih.gov). The IBIDS contains over 460,000 scientific citations and summaries about dietary supplements and nutrition as well as references to published international, scientific literature on dietary supplements such as vitamins, minerals, and botanicals.[7] The IBIDS includes references and citations to both human and animal research studies.

As a service of the ODS, access to the IBIDS database is available free of charge at the following Web address: **http://ods.od.nih.gov/databases/ibids.html**. After entering the search area, you have three choices: (1) IBIDS Consumer Database, (2) Full IBIDS Database, or (3) Peer Reviewed Citations Only.

Now that you have selected a database, click on the "Advanced" tab. An advanced search allows you to retrieve up to 100 fully explained references in a comprehensive format. Type "contact lenses" (or synonyms) into the search box, and click "Go." To narrow the search, you can also select the "Title" field.

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[7] Adapted from **http://ods.od.nih.gov**. IBIDS is produced by the Office of Dietary Supplements (ODS) at the National Institutes of Health to assist the public, healthcare providers, educators, and researchers in locating credible, scientific information on dietary supplements. IBIDS was developed and will be maintained through an interagency partnership with the Food and Nutrition Information Center of the National Agricultural Library, U.S. Department of Agriculture.

The following information is typical of that found when using the "Full IBIDS Database" to search for "contact lenses" (or a synonym):

- **Adherence of Aspergillus species to soft contact lenses and attempts to inhibit the adherence.**
  Author(s): Department of Human Microbiology, Sackler School of Medicine, Tel Aviv University, Israel.
  Source: SioNovember, E Sandovsky Losica, H Gov, Y Segal, E Mycoses. 2001 December; 44(11-12): 464-71 0933-7407
- **Adhesion of tear proteins to contact lenses and vials.**
  Author(s): Department of Math, Science and Technology, Nova Southeastern University, 3301 College Avenue, Fort Lauderdale, FL 33314, USA. edwardok@nova.edu
  Source: Keith, E O Boltz, M Gadh, R Ghorsriz, R Mangatt, D Janoff, L E Biotechnol-Appl-Biochem. 2001 August; 34(Pt 1): 5-12 0885-4513
- **Competitive adsorption of proteins on hydrogel contact lenses.**
  Author(s): Department of Biology, Gilan University, Rasht, Iran.
  Source: Sariri, R Sabbaghzadeh, R CLAO-J. 2001 July; 27(3): 159-62 0733-8902
- **Detection of mucin deposits on hydrogel contact lenses: evaluation of staining procedures and clinical significance.**
  Author(s): Research & Development, Personal Products Division, Bausch & Lomb, New York.
  Source: Klein, A E Optom-Vis-Sci. 1989 January; 66(1): 56-60 1040-5488
- **Effects of protein, mucin, and human tears on adherence of Pseudomonas aeruginosa to hydrophilic contact lenses.**
  Author(s): Laboratory for Microbial and Biochemical Sciences, Georgia State University, Atlanta 30303.
  Source: Miller, M J Wilson, L A Ahearn, D G J-Clin-Microbiol. 1988 March; 26(3): 513-7 0095-1137
- **Interactions of bacteria with contact lenses: the effect of soluble protein and carbohydrate on bacterial adhesion to contact lenses.**
  Author(s): Cooperative Research Centre for Eye Research and Technology, University of New South Wales, Sydney, Australia.
  Source: Williams, T J Willcox, M D Schneider, R P Optom-Vis-Sci. 1998 April; 75(4): 266-71 1040-5488
- **Spoilage of hydrogel contact lenses by lipid deposits. Tear-film potassium depression, fat, protein, and alcohol consumption.**
  Author(s): Contact Lens Research Foundation, Jericho, NY 11753.
  Source: Hart, D E Lane, B C Josephson, J E Tisdale, R R Gzik, M Leahy, R Dennis, R Ophthalmology. 1987 October; 94(10): 1315-21 0161-6420
- **Tear pH, air pollution, and contact lenses.**
  Author(s): School of Ophthalmic Optics, Division of Health Science, University of Barcelona, Spain.
  Source: Andres, S Garcia, M L Espina, M Valero, J Valls, O Am-J-Optom-Physiol-Opt. 1988 August; 65(8): 627-31 0093-7002
- **The effect of enzymatic contact lens cleaning on adherence of Pseudomonas aeruginosa to soft contact lenses.**
  Source: Stern, G A Zam, Z S Ophthalmology. 1987 February; 94(2): 115-9 0161-6420

Federal Resources on Nutrition

In addition to the IBIDS, the United States Department of Health and Human Services (HHS) and the United States Department of Agriculture (USDA) provide many sources of information on general nutrition and health. Recommended resources include:

- healthfinder®, HHS's gateway to health information, including diet and nutrition: **http://www.healthfinder.gov/scripts/SearchContext.asp?topic=238&page=0**
- The United States Department of Agriculture's Web site dedicated to nutrition information: **www.nutrition.gov**
- The Food and Drug Administration's Web site for federal food safety information: **www.foodsafety.gov**
- The National Action Plan on Overweight and Obesity sponsored by the United States Surgeon General: **http://www.surgeongeneral.gov/topics/obesity/**
- The Center for Food Safety and Applied Nutrition has an Internet site sponsored by the Food and Drug Administration and the Department of Health and Human Services: **http://vm.cfsan.fda.gov/**
- Center for Nutrition Policy and Promotion sponsored by the United States Department of Agriculture: **http://www.usda.gov/cnpp/**
- Food and Nutrition Information Center, National Agricultural Library sponsored by the United States Department of Agriculture: **http://www.nal.usda.gov/fnic/**
- Food and Nutrition Service sponsored by the United States Department of Agriculture: **http://www.fns.usda.gov/fns/**

Additional Web Resources

A number of additional Web sites offer encyclopedic information covering food and nutrition. The following is a representative sample:

- AOL: **http://search.aol.com/cat.adp?id=174&layer=&from=subcats**
- Family Village: **http://www.familyvillage.wisc.edu/med_nutrition.html**
- Google: **http://directory.google.com/Top/Health/Nutrition/**
- Healthnotes: **http://www.healthnotes.com/**
- Open Directory Project: **http://dmoz.org/Health/Nutrition/**
- Yahoo.com: **http://dir.yahoo.com/Health/Nutrition/**
- WebMD®Health: **http://my.webmd.com/nutrition**
- WholeHealthMD.com: **http://www.wholehealthmd.com/reflib/0,1529,,00.html**

CHAPTER 3. ALTERNATIVE MEDICINE AND CONTACT LENSES

Overview

In this chapter, we will begin by introducing you to official information sources on complementary and alternative medicine (CAM) relating to contact lenses. At the conclusion of this chapter, we will provide additional sources.

National Center for Complementary and Alternative Medicine

The National Center for Complementary and Alternative Medicine (NCCAM) of the National Institutes of Health (**http://nccam.nih.gov/**) has created a link to the National Library of Medicine's databases to facilitate research for articles that specifically relate to contact lenses and complementary medicine. To search the database, go to the following Web site: **http://www.nlm.nih.gov/nccam/camonpubmed.html**. Select "CAM on PubMed." Enter "contact lenses" (or synonyms) into the search box. Click "Go." The following references provide information on particular aspects of complementary and alternative medicine that are related to contact lenses:

- **1999 Costenbader Lecture. Outcome study in amblyopia: treatment and practice pattern variations.**
  Author(s): Mazow ML, Chuang A, Vital MC, Prager T.
  Source: J Aapos. 2000 February; 4(1): 1-9.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10675864&dopt=Abstract

- **A comparison of grating visual acuity, strabismus, and reoperation outcomes among children with aphakia and pseudophakia after unilateral cataract surgery during the first six months of life.**
  Author(s): Lambert SR, Lynn M, Drews-Botsch C, Loupe D, Plager DA, Medow NB, Wilson ME, Buckley EG, Drack AV, Fawcett SL.
  Source: J Aapos. 2001 April; 5(2): 70-5.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11304812&dopt=Abstract

- **A masked quantitative cytologic study of the safety of a multipurpose contact lens solution applied to the in vivo rabbit eye.**
  Author(s): Bergmanson JP, Ross RN.
  Source: J Am Optom Assoc. 1993 May; 64(5): 308-14.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8320413&dopt=Abstract

- **A new technique of contact lens storage, soaking and cleaning.**
  Author(s): Dabezies OH Jr, Naugle T.
  Source: Eye Ear Nose Throat Mon. 1971 October; 50(10): 378-82. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=4999816&dopt=Abstract

- **A safety test for contact lens wetting solutions. Evaluation of commercially available solutions.**
  Author(s): Rucker I, Kettrey R, Bach F, Zeleznick L.
  Source: Ann Ophthalmol. 1972 November; 4(11): 1000-6. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=4119929&dopt=Abstract

- **A sequential strategy for achieving functional binocularity in strabismus.**
  Author(s): Caloroso EE.
  Source: J Am Optom Assoc. 1988 May; 59(5): 378-87.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3397489&dopt=Abstract

- **Absorption of topical disodium cromoglycate and its preservatives by soft contact lenses.**
  Author(s): Iwasaki W, Kosaka Y, Momose T, Yasuda T.
  Source: The Clao Journal : Official Publication of the Contact Lens Association of Ophthalmologists, Inc. 1988 July-September; 14(3): 155-8.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3145159&dopt=Abstract

- **Acanthamoeba keratitis. A growing problem in soft and hard contact lens wearers.**
  Author(s): Moore MB, McCulley JP, Newton C, Cobo LM, Foulks GN, O'Day DM, Johns KJ, Driebe WT, Wilson LA, Epstein RJ, et al.
  Source: Ophthalmology. 1987 December; 94(12): 1654-61.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3431835&dopt=Abstract

- **Acquired posterior lentiglobus.**
  Author(s): Mohney BG, Parks MM.
  Source: American Journal of Ophthalmology. 1995 July; 120(1): 123-4.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7611322&dopt=Abstract

- **Acuity and contrast sensitivity in monkeys after neonatal intraocular lens implantation with and without part-time occlusion of the fellow eye.**
  Author(s): Boothe RG, Louden TM, Lambert SR.

Source: Investigative Ophthalmology & Visual Science. 1996 July; 37(8): 1520-31.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8675394&dopt=Abstract

- **Allergic and toxic reactions of soft contact lens wearers.**
  Author(s): Mondino BJ, Salamon SM, Zaidman GW.
  Source: Survey of Ophthalmology. 1982 May-June; 26(6): 337-44. Review.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=6810487&dopt=Abstract

- **Allergic reactions to contact lens solutions.**
  Author(s): Fisher AA.
  Source: Cutis; Cutaneous Medicine for the Practitioner. 1985 September; 36(3): 209-11.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3931986&dopt=Abstract

- **An analysis of contrast sensitivity in identical twins with keratoconus.**
  Author(s): Zadnik K, Mannis MJ, Johnson CA.
  Source: Cornea. 1984; 3(2): 99-103.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=6399238&dopt=Abstract

- **Analysis of biomaterials deposited on soft contact lenses.**
  Author(s): Wedler FC.
  Source: Journal of Biomedical Materials Research. 1977 July; 11(4): 525-35.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=873944&dopt=Abstract

- **Analysis of two 'home remedy' contact lens cleaners.**
  Author(s): Diefenbach CB, Seibert CK, Davis LJ.
  Source: J Am Optom Assoc. 1988 July; 59(7): 518-21.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2841368&dopt=Abstract

- **Annexin V binding to rabbit corneal epithelial cells following overnight contact lens wear or eyelid closure.**
  Author(s): Li L, Ren DH, Ladage PM, Yamamoto K, Petroll WM, Jester JV, Cavanagh HD.
  Source: The Clao Journal : Official Publication of the Contact Lens Association of Ophthalmologists, Inc. 2002 January; 28(1): 48-54.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11838990&dopt=Abstract

- **Anterior corneal mosaic in eyes with keratoconus wearing hard contact lenses.**
  Author(s): Dangel ME, Kracher GP, Stark WJ.
  Source: Archives of Ophthalmology. 1984 June; 102(6): 888-90.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=6732571&dopt=Abstract

- **Antimicrobial efficacy of two commercial RGP contact lens care systems.**
  Author(s): Modi P, Gresh W, Shih K.
  Source: The Clao Journal : Official Publication of the Contact Lens Association of Ophthalmologists, Inc. 1995 January; 21(1): 24-6.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7712601&dopt=Abstract

- **Approaching myopia holistically: a case study and theoretical exploration.**
  Author(s): Bambridge A.
  Source: Journal of Alternative and Complementary Medicine (New York, N.Y.). 2002 June; 8(3): 371-7.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12165195&dopt=Abstract

- **Asymmetrical visual deprivation: a technique to differentially influence lateral hemispheric function.**
  Author(s): Levick SE, Lorig T, Wexler BE, Gur RE, Gur RC, Schwartz GE.
  Source: Percept Mot Skills. 1993 June; 76(3 Pt 2): 1363-82.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8337093&dopt=Abstract

- **Benzalkonium chloride toxicity to the human cornea.**
  Author(s): Gasset AR.
  Source: American Journal of Ophthalmology. 1977 August; 84(2): 169-71.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=888887&dopt=Abstract

- **Cataract progression in patients with atopic dermatitis.**
  Author(s): Nagaki Y, Hayasaka S, Kadoi C.
  Source: Journal of Cataract and Refractive Surgery. 1999 January; 25(1): 96-9.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9888084&dopt=Abstract

- **Collagenase and the cornea.**
  Author(s): Slansky HH, Dohlman CH.
  Source: Survey of Ophthalmology. 1970 March; 14(5): 402-15. Review.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=4316553&dopt=Abstract

- **Collagenase inhibitors (penicillamine).**
  Author(s): Francois J, Cambie E, Feher J, Van Den Eeckhout E.
  Source: Ann Ophthalmol. 1973 April; 5(4): 391-8 Passim. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=4349851&dopt=Abstract

- **Conjunctivitis due to soft lens solutions.**
  Author(s): van Ketel WG, Melzer-van Riemsdijk FA.

Source: Contact Dermatitis. 1980 August; 6(5): 321-4.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=6774850&dopt=Abstract

- **Costenbader Lecture. Idiopathic infantile nystagmus: diagnosis and treatment.**
  Author(s): Reinecke RD.
  Source: J Aapos. 1997 June; 1(2): 67-82. Review.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10875081&dopt=Abstract

- **Current methods of treating and preventing myopia.**
  Author(s): Woo GC, Wilson MA.
  Source: Optometry and Vision Science : Official Publication of the American Academy of Optometry. 1990 September; 67(9): 719-27. Review.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2234833&dopt=Abstract

- **Development of grating acuity in children treated for unilateral or bilateral congenital cataract.**
  Author(s): Lewis TL, Maurer D, Brent HP.
  Source: Investigative Ophthalmology & Visual Science. 1995 September; 36(10): 2080-95.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7657547&dopt=Abstract

- **Differences in time course and visual requirements of ocular responses to lenses and diffusers.**
  Author(s): Kee CS, Marzani D, Wallman J.
  Source: Investigative Ophthalmology & Visual Science. 2001 March; 42(3): 575-83.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11222513&dopt=Abstract

- **Diffuser contact lenses retard axial elongation in infant rhesus monkeys.**
  Author(s): Bradley DV, Fernandes A, Tigges M, Boothe RG.
  Source: Vision Research. 1996 February; 36(4): 509-14.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8854996&dopt=Abstract

- **Discrimination against contact lens wearers.**
  Author(s): Blais BR.
  Source: Journal of Occupational and Environmental Medicine / American College of Occupational and Environmental Medicine. 1998 October; 40(10): 876-80.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9800172&dopt=Abstract

- **Dopamine synthesis and metabolism in rhesus monkey retina: development, aging, and the effects of monocular visual deprivation.**
  Author(s): Iuvone PM, Tigges M, Fernandes A, Tigges J.

Source: Visual Neuroscience. 1989; 2(5): 465-71.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2577263&dopt=Abstract

- **Early binocular visual experience may improve binocular sensory outcomes in children after surgery for congenital unilateral cataract.**
Author(s): Jeffrey BG, Birch EE, Stager DR Jr, Stager DR Sr, Weakley DR Jr.
Source: J Aapos. 2001 August; 5(4): 209-16.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11507579&dopt=Abstract

- **Early treatment of congenital unilateral cataract minimizes unequal competition.**
Author(s): Birch EE, Stager D, Leffler J, Weakley D.
Source: Investigative Ophthalmology & Visual Science. 1998 August; 39(9): 1560-6.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9699545&dopt=Abstract

- **Effect of contact lens preservatives on Acanthamoeba.**
Author(s): Silvany RE, Dougherty JM, McCulley JP.
Source: Ophthalmology. 1991 June; 98(6): 854-7.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1866136&dopt=Abstract

- **Extended wear of Hydrocurve II55 soft contact lenses.**
Author(s): Miller JP, Coon LJ, Meier RF.
Source: J Am Optom Assoc. 1980 March; 51(3): 225-30, 232-3.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7372982&dopt=Abstract

- **Hypnosis and suggestion for fitting contact lenses.**
Author(s): Barber J, Malin AH.
Source: J Am Optom Assoc. 1977 March; 48(3): 379-82.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=864191&dopt=Abstract

- **Perspective on contact lenses. Parents and cataract kids.**
Author(s): Rakow PL.
Source: J Ophthalmic Nurs Technol. 1986 March-April; 5(2): 74-5. No Abstract Available.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3634014&dopt=Abstract

- **Photokeratoscopy in the fitting of soft contact lenses.**
Author(s): Feldman GL.
Source: Ann Ophthalmol. 1975 April; 7(4): 517-22, 525-9.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=1096733&dopt=Abstract

- **The effect of varying prism and truncation on the performance of soft contact lenses.**
Author(s): Tomlinson A, Schoessler J, Andrasko G.

Source: Am J Optom Physiol Opt. 1980 October; 57(10): 714-20.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7446680&dopt=Abstract

- **The effectiveness of occluder contact lenses in improving occlusion compliance in patients that have failed traditional occlusion therapy.**
  Author(s): Joslin CE, McMahon TT, Kaufman LM.
  Source: Optometry and Vision Science : Official Publication of the American Academy of Optometry. 2002 June; 79(6): 376-80.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12086304&dopt=Abstract

- **The use of spherical power effect bitoric rigid contact lenses in hospital practice.**
  Author(s): Weissman BA, Chun MW.
  Source: J Am Optom Assoc. 1987 August; 58(8): 626-30.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3624754&dopt=Abstract

- **Treatment of amblyopia by extended-wear occlusion soft contact lenses.**
  Author(s): Tsubota K, Yamada M.
  Source: Ophthalmologica. Journal International D'ophtalmologie. International Journal of Ophthalmology. Zeitschrift Fur Augenheilkunde. 1994; 208(4): 214-5.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7970550&dopt=Abstract

Additional Web Resources

A number of additional Web sites offer encyclopedic information covering CAM and related topics. The following is a representative sample:

- Alternative Medicine Foundation, Inc.: **http://www.herbmed.org/**
- AOL: **http://search.aol.com/cat.adp?id=169&layer=&from=subcats**
- Chinese Medicine: **http://www.newcenturynutrition.com/**
- drkoop.com®: **http://www.drkoop.com/InteractiveMedicine/IndexC.html**
- Family Village: **http://www.familyvillage.wisc.edu/med_altn.htm**
- Google: **http://directory.google.com/Top/Health/Alternative/**
- Healthnotes: **http://www.healthnotes.com/**
- MedWebPlus: **http://medwebplus.com/subject/Alternative_and_Complementary_Medicine**
- Open Directory Project: **http://dmoz.org/Health/Alternative/**
- HealthGate: **http://www.tnp.com/**
- WebMD®Health: **http://my.webmd.com/drugs_and_herbs**
- WholeHealthMD.com: **http://www.wholehealthmd.com/reflib/0,1529,,00.html**
- Yahoo.com: **http://dir.yahoo.com/Health/Alternative_Medicine/**

The following is a specific Web list relating to contact lenses; please note that any particular subject below may indicate either a therapeutic use, or a contraindication (potential danger), and does not reflect an official recommendation (some Web sites are subscription based):

- **General Overview**

  Conjunctivitis
  Source: Integrative Medicine Communications; www.drkoop.com

  Conjunctivitis and Blepharitis
  Source: Healthnotes, Inc. www.healthnotes.com

  Pink Eye
  Source: Integrative Medicine Communications; www.drkoop.com

- **Herbs and Supplements**

  Cayenne
  Source: WholeHealthMD.com, LLC. www.wholehealthmd.com
  Hyperlink:
  http://www.wholehealthmd.com/refshelf/substances_view/0,1525,765,00.html

General References

A good place to find general background information on CAM is the National Library of Medicine. It has prepared within the MEDLINEplus system an information topic page dedicated to complementary and alternative medicine. To access this page, go to the MEDLINEplus site at **http://www.nlm.nih.gov/medlineplus/alternativemedicine.html**. This Web site provides a general overview of various topics and can lead to a number of general sources.

CHAPTER 4. DISSERTATIONS ON CONTACT LENSES

Overview

In this chapter, we will give you a bibliography on recent dissertations relating to contact lenses. We will also provide you with information on how to use the Internet to stay current on dissertations. **IMPORTANT NOTE:** When following the search strategy described below, you may discover non-medical dissertations that use the generic term "contact lenses" (or a synonym) in their titles. To accurately reflect the results that you might find while conducting research on contact lenses, we have not necessarily excluded non-medical dissertations in this bibliography.

Dissertations on Contact Lenses

ProQuest Digital Dissertations, the largest archive of academic dissertations available, is located at the following Web address: **http://wwwlib.umi.com/dissertations**. From this archive, we have compiled the following list covering dissertations devoted to contact lenses. You will see that the information provided includes the dissertation's title, its author, and the institution with which the author is associated. The following covers recent dissertations found when using this search procedure:

- **The Effects of Contact Lenses on the Corneal Epithelial Barrier Function and Post-lens Tear Film** by Lin, Meng Ching; Phd from University of California, Berkeley, 2002, 118 pages
  http://wwwlib.umi.com/dissertations/fullcit/3063456

Keeping Current

Ask the medical librarian at your library if it has full and unlimited access to the *ProQuest Digital Dissertations* database. From the library, you should be able to do more complete searches via **http://wwwlib.umi.com/dissertations**.

CHAPTER 5. CLINICAL TRIALS AND CONTACT LENSES

Overview

In this chapter, we will show you how to keep informed of the latest clinical trials concerning contact lenses.

Recent Trials on Contact Lenses

The following is a list of recent trials dedicated to contact lenses.[8] Further information on a trial is available at the Web site indicated.

- **Dynamic Light Scattering and Keratoscopy for Corneal Examination**

  Condition(s): Corneal Diseases

  Study Status: This study is currently recruiting patients.

  Sponsor(s): National Eye Institute (NEI)

  Purpose - Excerpt: This pilot study will examine the usefulness of a new instrument called the Dynamic Light Scattering (DLS) device for documenting and monitoring changes in the cornea, the front part of the eye where **contact lenses** are placed. The DLS device uses a low-intensity laser similar to that used in supermarket checkouts to measure the cloudiness of the cornea. The results of this study may lead to further investigations using DLS to discover the cause of corneal clouding and to develop treatments to prevent it. Healthy volunteers and patients with corneal clouding or opacification 18 years of age and older may be eligible for this study. Participants will have a standard eye examination, including a check of visual acuity and eye pressure. The retina will also be examined and photographs of the cornea may be taken. For the DLS test, the subject sits in front of the device and looks at a yellow-green target while the cloudiness of the cornea is measured. Subjects will be tested four times. The entire procedure takes less than 30 minutes.

  Study Type: Observational

  Contact(s): see Web site below

  Web Site: http://clinicaltrials.gov/ct/show/NCT00050466

[8] These are listed at **www.ClinicalTrials.gov**.

- **Effect of DHA Supplements on Macular Function in Patients with Stargardt Macular Dystrophy and Stargardt-like Macular Dystrophy**

  Condition(s): Macular Degeneration

  Study Status: This study is currently recruiting patients.

  Sponsor(s): National Eye Institute (NEI)

  Purpose - Excerpt: This study will evaluate whether docosahexaenoic acid (DHA) dietary supplementation can improve macular function in patients with Stargardt macular dystrophy and Stargardt-like macular dystrophy. Stargardt macular dystrophy is a recessive inherited trait that causes a severe form of macular degeneration. (The macula is the center part of the retina in the back of the eye that is responsible for fine vision.) The disorder begins in late childhood and progresses to a significant decrease in central vision. One of the earliest signs of the disorder is accumulation in and under the macula of a fatty pigment called lipofuscin. Stargardt-like macular dystrophy is a dominant inherited trait involving loss of central vision, but it begins later than Stargardt macular dystrophy, and the accumulation of lipofuscin extends beyond the central region of the macula. DHA is a fatty acid that is essential for normal brain and eye development. It is normally found in the diet, but not in large amounts. Supplements may help prevent or slow the progression of some eye diseases. Patients with autosomal dominant Stargardt-like macular dystrophy or autosomal recessive Stargardt macular dystrophy are eligible for this study. Candidates will be screened with the following tests and procedures: - Medical history and physical examination. - Blood test to measure levels of DHA and vitamins. - Eye examination: The patient's vision and eye pressure are tested, then the pupils are dilated to examine structures inside the eye. Photographs are also taken. - Visual field test: The patient looks at a tiny spot of light projected onto a white screen and is asked to note when other lights appear at other places on the screen. - Electroretinogram (ERG): An electrode (small silver disk) is taped to the patient's forehead. Drops are given to numb the eyes and special **contact lenses** are inserted in the eyes. For the first part of the test, the patient looks at the center of a black and white checkerboard screen that flickers for 30 seconds at a time. This is repeated 16 or more times. For the second part of the test, the patient looks inside a sphere, in which flashes of light flicker for 20 seconds at a time. This is repeated four or more times. The **contact lenses** sense small electrical signals generated by the retina during the tests. Participants will begin taking DHA capsules or a placebo (look-alike capsules with no active ingredient) from 1 week to 3 months after enrolling in the study and will repeat several of the screening tests at follow-up visits scheduled 3, 6, 9, 12, and 15 months after they start taking the capsules. They will also be interviewed about any treatment side effects.

  Phase(s): Phase I

  Study Type: Interventional

  Contact(s): see Web site below

  Web Site: http://clinicaltrials.gov/ct/show/NCT00060749

- **Evaluation and Treatment of Patients with Inherited Eye Diseases**

  Condition(s): Hereditary Eye Disease

  Study Status: This study is currently recruiting patients.

  Sponsor(s): National Eye Institute (NEI)

Purpose - Excerpt: This study offers evaluation and treatment for patients with inherited (genetic) eye diseases. The protocol is not designed to test new treatments; rather, patients will receive current standard of care treatments. The purpose of the study is twofold: 1) to allow National Eye (NEI) Institute physicians to increase their knowledge of various genetic eye diseases, identify possible new avenues of research in this area, and maintain their clinical skills; and 2) to establish a pool of patients who may be eligible for new studies as they are developed. (Participants in this protocol will not be required to join a new study; the decision will be voluntary.) Children and adults with genetic eye diseases may be eligible for this study. Candidates will be screened with a medical and family history, thorough eye examination and blood test. The eye examination includes measurements of eye pressure and visual acuity (ability to see the vision chart) and dilation of the pupils with eye drops to examine the lens and retina (back part of the eye). Patients may also undergo additional diagnostic tests needed to determine eligibility for other NEI studies, including routine laboratory testing, imaging, questionnaires, a physical examination, and other standard and specialized tests and procedures as needed. In addition, patients will have special photographs taken of the eye to document the clarity or opacity of the eye lens. They will also undergo a procedure called electroretinography to assess the eye's response to bright lights. For this procedure, the eye is numbed with anesthetic drops and a contact lens is placed in the eye. The patient looks inside a large, hollow sphere and sees flashes of light, first in darkness and then in light. The **contact lenses** sense small electrical signals generated by the retina. Patients who need medical care will be given appropriate standard medical treatment. Those who are found eligible for a research study will be recommended for participation in that study and taken off this one. Participants will be followed at least 3 years. Follow-up visits are scheduled according to the standard of care for the individual patient's eye problem. Patients in this protocol will probably have 1 to 3 follow-up visits per year.

Study Type: Interventional

Contact(s): see Web site below

Web Site: http://clinicaltrials.gov/ct/show/NCT00011817

- **Evaluation of Safety of Ciliary Neurotrophic Factor Implants in the Eye**

  Condition(s): Retinitis Pigmentosa

  Study Status: This study is currently recruiting patients.

  Sponsor(s): National Eye Institute (NEI)

  Purpose - Excerpt: This study will evaluate the safety of a ciliary neurotrophic factor (CNTF) implant placed in the eye to allow the release of CNTF directly on the retina. The results of this study may lead to a larger investigation of CNTF implants to treat retinitis pigmentosa (RP), a progressive degenerative eye disease that begins with loss of peripheral vision and night blindness and often leads to blindness in later life. Currently, there are no effective treatments for RP. Researchers have found, however, that certain proteins, called ciliary neurotrophic factor (CNTF), can partially protect cells in the eye if given directly inside the eye. A major challenge in treating RP is to deliver medicine directly into the eye. One way to ensure that CNTF gets into the eye is to surgically place an implant inside the eye to release the protein. Patients 18 years of age and older with retinitis pigmentosa whose visual acuity is 20/100 or worse may be eligible for this study. Candidates will be screened with a medical history, physical examination, eye examinations, and eye photographs. The eye examination includes measurement of visual acuity and eye pressure, examination of the pupils and eye

movements, and examination of the lens and back of the eye. In addition, patients will have the following tests: - Visual field test: Patients look at a central spot on a white screen and tell the examiner whenever they see a small light appear at other places on the screen. - Electroretinogram (ERG): Electrodes are taped to the patient's forehead. Special **contact lenses** are placed on the eyes, similar to normal **contact lenses**, after the eye has been numbed with drops. The **contact lenses** sense small electrical signals generated by the retina. The ERG measures the electrical activity of the retina when it is stimulated by light. For the ERG recording, the patient looks inside a large, hollow, dark sphere, and sees flashes of light, first in the dark, and then with a light turned on in the sphere. - Optical coherence tomography: This test, done with the machine used to examine the eye, measures retinal thickness by producing cross-sectional pictures of the retina. Participants undergo surgery at the NIH Clinical Center in a 30-minute operation to place the implant in one eye. The surgery is done under local anesthetic. Before the procedure, patients are given a steroid injection along side the eye to minimize inflammation after surgery. Following the procedure, patients return for follow-up visits once a month for 6 months. At these visits, several of the exams described above are repeated to evaluate treatment effects and check for adverse side effects. After 6 months, the implant is surgically removed. Post-surgical care for both implant and explant surgeries include examinations the day and week after surgery to examine the wound, a high dose of steroid immediately after surgery, oral antibiotics for 7 days, and eye drops for 1 week to prevent infection and inflammation.

Phase(s): Phase I

Study Type: Interventional

Contact(s): see Web site below

Web Site: http://clinicaltrials.gov/ct/show/NCT00063765

- **EYE001 to Treat Retinal Tumors in Patients with Von Hippel-Lindau Syndrome**

  Condition(s): Hippel-Lindau Disease

  Study Status: This study is currently recruiting patients.

  Sponsor(s): National Eye Institute (NEI)

  Purpose - Excerpt: This study will test the ability of the experimental drug EYE001 to reduce retinal thickening and improve vision in patients with Von Hippel-Lindau syndrome (VHL). Angiomas (blood vessel tumors) commonly develop in the back of the eye on the retina and the optic nerve in patients with VHL. Although the tumors are not cancerous, they may cause significant vision loss. Current treatments, including laser therapy, cryotherapy, and vitrectomy, may not be successful or possible for all patients. EYE001 decreases production of VEGF, a growth factor that is important for the formation of new blood vessels and that is elevated in VHL. Preliminary findings from studies of other retinal diseases suggest that EYE001 can reduce retinal thickening and improve vision. Patients 18 years of age and older with retinal angiomas due to VHL in one or both eyes and central vision loss of 20/40 or worse may be eligible for this study. Participants will undergo the following tests and procedures: - Medical history, physical examination, electrocardiogram (EKG) and blood tests. - Eye examination, including eye pressure measurement and dilation of the pupils to examine the retina. - Fluorescein angiography to evaluate the eye's blood vessels. For this test, a yellow dye is injected into an arm vein and travels to the blood vessels in the eyes. Pictures of the retina are taken using a camera that flashes a blue light into the eye. The pictures will reveal if any dye has leaked from the vessels into the retina, indicating possible blood vessel

abnormality. - Optical coherence tomography to measure retinal thickness. The eyes are examined through a machine that produces cross-sectional pictures of the retina. These measures are repeated during the study to determine changes, if any, in retinal thickening. - Electroretinogram (ERG) to measure electrical responses generated from within the retina. For this test, the patient sits in a dark room for 30 minutes with his or her eyes patched. Then, a small silver disk electrode is taped to the forehead, the eye patches are removed, the surface of the eye is numbed with eye drops, and **contact lenses** are placed on the eyes. The patient looks inside an open white globe that emits a series of light flashes for about 20 minutes. The **contact lenses** sense small electrical signals generated by the retina when the light flashes. - Stereoscopic color fundus photography to examine the back of the eye. The pupils are dilated with eye drops to examine and photograph the back of the eye. - EYE001 injections to treat ocular angiomas. Patients receive EYE001 injections through a needle into the eye's vitreous (gel-like substance that fills the inside of the eye). Six injections are given over a 30-week period. Before each injection, the surface of the eye is numbed with anesthetic eye drops. This is followed by injection of another anesthetic into the lower portion of they eye in the clear tissue surrounding the white of the eye. After a few minutes, the EYE001 is injected into the vitreous. Patients receive EYE001 injections at the first visit (during enrollment) and again at 6, 12, 18, 24, and 30 weeks after the first injection. At each injection visit, participants repeat most of the tests described above to evaluate the response to treatment and return a week later for another eye examination. After the last injection, patients whose vision has improved may receive three more treatments at visits 36, 42, and 48. All participants will return for examinations at week 54 and at 2 months after their final injection.

Phase(s): Phase I

Study Type: Interventional

Contact(s): see Web site below

Web Site: http://clinicaltrials.gov/ct/show/NCT00056199

- **Raman Scattering Spectroscopy to Measure Macular Pigment**

  Condition(s): Raman Spectroscopy

  Study Status: This study is currently recruiting patients.

  Sponsor(s): National Eye Institute (NEI)

  Purpose - Excerpt: This study will evaluate the ease and reliability of Raman scattering spectroscopy, a new technique to measure the amount of the pigment lutein in the retina, the light-sensitive tissue lining the back of the eye. The highest concentrations of lutein are in the center of the retina, called the macula, which is the area most important for fine, detailed vision. The functions of lutein are not fully known. Besides absorbing blue light, it may help protect against abnormal changes in the retina, such as age-related macular degeneration. Until recently, lutein was measured using long, cumbersome, and difficult tests. This study will evaluate a new instrument that provides faster measurements. It will be tested under different conditions, such as wearing or not wearing glasses or **contact lenses**, or dilating or not dilating the pupil of the eye. Healthy normal volunteers between 20 and 65 years of age may be eligible for this study, which involves two visits to the NIH Clinical Center, as follows: Visit 1 - Screening - Medical history and physical examination, including measurement of vital signs (blood pressure, pulse, temperature, and breathing rate), and examination of the head and neck, heart and lungs, and arms and legs. - Eye examination, including eye

chart test, eye pressure measurement, examination of pupils and eye movements, and examination of the retina (back part of the eye) using a strong light and magnifying lens after dilation of the pupils. - Raman scattering spectroscopy to measure lutein. For this test, the subject looks with one eye at a brief, bright flash of bluish light (similar to a flashbulb light) from a laser. This is repeated several times. Subjects who wear glasses or **contact lenses** for distance vision will be tested without them and then again with a lens in front of the eye. Subjects who do not wear glasses or **contact lenses** will be tested before and after dilation of the pupil. - Contrast sensitivity to assess ability to identify an object from the background and to see everyday objects. The subject looks at and identifies a variety of objects of different shapes and sizes. - Color vision to determine the ability to identify different shades of color. The subject arranges a line of colorful discs, similar to checkers, in order of similar shades. Visit 2 - Repeat Spectroscopy Subjects return 1 week after the screening visit for a repeat Raman scattering spectroscopy to evaluate the precision of the measurements.

Phase(s): Phase I; MEDLINEplus consumer health information

Study Type: Interventional

Contact(s): see Web site below

Web Site: http://clinicaltrials.gov/ct/show/NCT00060580

- **The Contact Lens and Myopia Progression (CLAMP) Study**

  Condition(s): Myopia

  Study Status: This study is no longer recruiting patients.

  Sponsor(s): National Eye Institute (NEI)

  Purpose - Excerpt: To examine the effects of rigid gas permeable **contact lenses** on the progression of myopia (nearsightedness) in children To determine what changes in the eyes cause certain eyes to progress in nearsightedness more slowly

  Study Type: Observational

  Contact(s): see Web site below

  Web Site: http://clinicaltrials.gov/ct/show/NCT00009529

- **Eye Muscle Surgery to Treat Congenital Nystagmus**

  Condition(s): Nystagmus

  Study Status: This study is completed.

  Sponsor(s): National Eye Institute (NEI)

  Purpose - Excerpt: This study will examine the safety and effectiveness of a new surgical procedure to correct congenital nystagmus-a disorder of eye muscle-vision-brain coordination characterized by rapid to and fro eye movements (oscillation). Nystagmus usually begins in infancy or early childhood; its effect on vision varies greatly among patients. Current treatments, such as prism glasses, acupuncture, electronic nerve stimulation, **contact lenses**, various drug treatments, and others have had limited success. Patients with congenital nystagmus sometimes have other eye problems as well, such as cataracts, glaucoma, astigmatism or strabismus (cross-eyes). When these patients have eye muscle surgery to correct a problem, such as strabismus, their nystagmus also improves. Researchers think that simply cutting the muscles might produce this beneficial effect. This study will test this hypothesis-the horizontal muscles of the eye will be cut and then reattached in the same position. This procedure has been

tried in one sheepdog with good results. This small preliminary trial will include five adult patients with congenital nystagmus who have no other treatment options. It will evaluate the safety of the surgery and its effect on eye oscillation and vision. If the procedure is found to be safe, additional patients will be studied. Patients will have a medical history, basic physical examination, complete eye examination, and electro-oculography (eye movement recordings) to determine if eligibility for the study. Those accepted into the study will undergo eye muscle surgery and followup eye examinations and electro-oculography at 1 week, 6 weeks, 6 months, 1 year, 2 years and 3 years after surgery.

Phase(s): Phase II

Study Type: Interventional

Contact(s): see Web site below

Web Site: http://clinicaltrials.gov/ct/show/NCT00001866

- **Modified Intraocular Lens to Reduce Eye Inflammation After Cataract Surgery in Uveitis Patients**

  Study Status: This study is completed.

  Sponsor(s): National Eye Institute (NEI)

  Purpose - Excerpt: This study will test the effectiveness of an intraocular lens treated with heparin in reducing or preventing inflammation after cataract surgery in patients with uveitis. Patients with uveitis (inflammatory eye disease) often develop cataracts (clouding of the lens of the eye) that can impair eyesight. Cataracts can be removed surgically, and this is usually done when poor vision interferes with adequate daily functioning, or when the lens becomes too cloudy to evaluate the level of eye inflammation in uveitis-information needed to adjust medication dosages. After surgery, vision is corrected with special eyeglasses, **contact lenses**, or intraocular lenses (IOL). IOLs are small, plastic artificial lenses permanently placed inside the eye. Patients with uveitis who require cataract surgery and whose eye inflammation has been controlled by medicine for at least 3 months may be eligible for this study. Those enrolled in the study will be randomly assigned to one of two treatment groups: one group will have a standard IOL implanted during cataract surgery; the other will receive a heparin-treated IOL. Before surgery, patients will undergo standard preoperative tests, including chest X-ray, electrocardiogram, blood tests and urinalysis, as well as an eye examination that includes photography of the cornea, iris and retina. Additional tests and examinations to be done at the start of the study and at periodic follow-up visits for about 1 year may include: fluorescein angiography to evaluate the blood vessels of the retina; specular microscopy to examine the surface of the IOL; cell and flare measurements to evaluate inflammation, and ultrasound to examine the back of the eye.

  Phase(s): Phase II; MEDLINEplus consumer health information

  Study Type: Interventional

  Contact(s): see Web site below

  Web Site: http://clinicaltrials.gov/ct/show/NCT00001311

Keeping Current on Clinical Trials

The U.S. National Institutes of Health, through the National Library of Medicine, has developed ClinicalTrials.gov to provide current information about clinical research across the broadest number of diseases and conditions.

The site was launched in February 2000 and currently contains approximately 5,700 clinical studies in over 59,000 locations worldwide, with most studies being conducted in the United States. ClinicalTrials.gov receives about 2 million hits per month and hosts approximately 5,400 visitors daily. To access this database, simply go to the Web site at **http://www.clinicaltrials.gov/** and search by "contact lenses" (or synonyms).

While ClinicalTrials.gov is the most comprehensive listing of NIH-supported clinical trials available, not all trials are in the database. The database is updated regularly, so clinical trials are continually being added. The following is a list of specialty databases affiliated with the National Institutes of Health that offer additional information on trials:

- For clinical studies at the Warren Grant Magnuson Clinical Center located in Bethesda, Maryland, visit their Web site: **http://clinicalstudies.info.nih.gov/**
- For clinical studies conducted at the Bayview Campus in Baltimore, Maryland, visit their Web site: **http://www.jhbmc.jhu.edu/studies/index.html**
- For cancer trials, visit the National Cancer Institute: **http://cancertrials.nci.nih.gov/**
- For eye-related trials, visit and search the Web page of the National Eye Institute: **http://www.nei.nih.gov/neitrials/index.htm**
- For heart, lung and blood trials, visit the Web page of the National Heart, Lung and Blood Institute: **http://www.nhlbi.nih.gov/studies/index.htm**
- For trials on aging, visit and search the Web site of the National Institute on Aging: **http://www.grc.nia.nih.gov/studies/index.htm**
- For rare diseases, visit and search the Web site sponsored by the Office of Rare Diseases: **http://ord.aspensys.com/asp/resources/rsch_trials.asp**
- For alcoholism, visit the National Institute on Alcohol Abuse and Alcoholism: **http://www.niaaa.nih.gov/intramural/Web_dicbr_hp/particip.htm**
- For trials on infectious, immune, and allergic diseases, visit the site of the National Institute of Allergy and Infectious Diseases: **http://www.niaid.nih.gov/clintrials/**
- For trials on arthritis, musculoskeletal and skin diseases, visit newly revised site of the National Institute of Arthritis and Musculoskeletal and Skin Diseases of the National Institutes of Health: **http://www.niams.nih.gov/hi/studies/index.htm**
- For hearing-related trials, visit the National Institute on Deafness and Other Communication Disorders: **http://www.nidcd.nih.gov/health/clinical/index.htm**
- For trials on diseases of the digestive system and kidneys, and diabetes, visit the National Institute of Diabetes and Digestive and Kidney Diseases: **http://www.niddk.nih.gov/patient/patient.htm**
- For drug abuse trials, visit and search the Web site sponsored by the National Institute on Drug Abuse: **http://www.nida.nih.gov/CTN/Index.htm**

- For trials on mental disorders, visit and search the Web site of the National Institute of Mental Health: **http://www.nimh.nih.gov/studies/index.cfm**
- For trials on neurological disorders and stroke, visit and search the Web site sponsored by the National Institute of Neurological Disorders and Stroke of the NIH: **http://www.ninds.nih.gov/funding/funding_opportunities.htm#Clinical_Trials**

CHAPTER 6. PATENTS ON CONTACT LENSES

Overview

Patents can be physical innovations (e.g. chemicals, pharmaceuticals, medical equipment) or processes (e.g. treatments or diagnostic procedures). The United States Patent and Trademark Office defines a patent as a grant of a property right to the inventor, issued by the Patent and Trademark Office.[9] Patents, therefore, are intellectual property. For the United States, the term of a new patent is 20 years from the date when the patent application was filed. If the inventor wishes to receive economic benefits, it is likely that the invention will become commercially available within 20 years of the initial filing. It is important to understand, therefore, that an inventor's patent does not indicate that a product or service is or will be commercially available. The patent implies only that the inventor has "the right to exclude others from making, using, offering for sale, or selling" the invention in the United States. While this relates to U.S. patents, similar rules govern foreign patents.

In this chapter, we show you how to locate information on patents and their inventors. If you find a patent that is particularly interesting to you, contact the inventor or the assignee for further information. **IMPORTANT NOTE:** When following the search strategy described below, you may discover non-medical patents that use the generic term "contact lenses" (or a synonym) in their titles. To accurately reflect the results that you might find while conducting research on contact lenses, we have not necessarily excluded non-medical patents in this bibliography.

Patents on Contact Lenses

By performing a patent search focusing on contact lenses, you can obtain information such as the title of the invention, the names of the inventor(s), the assignee(s) or the company that owns or controls the patent, a short abstract that summarizes the patent, and a few excerpts from the description of the patent. The abstract of a patent tends to be more technical in nature, while the description is often written for the public. Full patent descriptions contain much more information than is presented here (e.g. claims, references, figures, diagrams, etc.). We will tell you how to obtain this information later in the chapter. The following is an

[9]Adapted from the United States Patent and Trademark Office: **http://www.uspto.gov/web/offices/pac/doc/general/whatis.htm**.

example of the type of information that you can expect to obtain from a patent search on contact lenses:

- **Agent for contact lenses**

  Inventor(s): Tsuzuki; Akira (Kasugai, JP), Mori; Osamu (Kasugai, JP)

  Assignee(s): Menicon Co., Ltd. (Nagoya, JP)

  Patent Number: 6,177,480

  Date filed: March 23, 1999

  Abstract: An agent for contact lenses, which comprises an aqueous medium and synthetic smectites particulates consisting essentially of primary particles having a particle size of at most 200 nm, dispersed in the aqueous medium.

  Excerpt(s): The present invention relates to an agent for contact lenses. Particularly, it relates to an agent for contact lenses, which is useful for cleaning, preserving, rinsing, stabilizing, disinfecting or fitting contact lenses.... Heretofore, as one type of an agent for contact lenses to be used for treatment such as cleaning, rinsing, preserving or disinfecting contact lenses, an agent of high viscosity type is known which has a viscosity of a solution type agent for contact lenses increased from the viewpoint of handling efficiency or efficiency for an operation of treatment of contact lenses with it. For example, a high viscosity type cleaning agent for contact lenses, is known wherein the viscosity of a cleaning solution is increased by means of a common thickener such as carboxymethyl cellulose.... However, if such a high viscosity type cleaning agent is employed for cleaning a contact lens, such a cleaning agent is likely to remain on the contact lens surface, and it has been difficult to adequately wash it off even if rinsing of the contact lens is repeated. Further, in a case where an organic polymer thickener is used to increase the viscosity of the solution, such a thickener itself becomes a nutrient for bacteria, and accordingly there has been a problem that bacteria are likely to propagate in the agent for contact lenses, such as a cleaning agent.

  Web site: http://www.delphion.com/details?pn=US06177480__

- **Alcohol-containing abrasive composition for cleaning contact lenses**

  Inventor(s): Potini; Chimpiramma (Methuen, MA), Wrobel; Stanley J. (Andover, MA)

  Assignee(s): Wilmington Partners LP (Rochester, NY)

  Patent Number: 5,888,950

  Date filed: November 19, 1996

  Abstract: An aqueous composition for cleaning contact lenses comprises an aliphatic monohydric alcohol, a surface active agent having cleaning action for contact lens deposits, and an abrasive agent.

  Excerpt(s): This invention relates to a composition for cleaning contact lenses. The composition comprises an aliphatic monohydric alcohol, a surface active material having cleaning action for contact lens deposits, and an abrasive agent.... The tendency of contact lens materials to form deposits necessitates regular cleaning of the contact lenses. Deposits from the tear film include protein, lipid and mucin, and deposits from external sources include cosmetic deposits, such as from mascara or hair spray, or materials deposited when the lens is handled.... Enzymatic contact lens cleaners are

frequently used to remove protein deposits, especially denatured proteins, particularly with hydrophilic soft contact lenses for which protein is the major deposit problem. However, enzymatic cleaners are not particularly effective for other types of deposits.

Web site: http://www.delphion.com/details?pn=US05888950__

- **Apparatus and method for cleaning and disinfecting contact lenses**

  Inventor(s): Stone; Ralph P. (Arlington, TX)

  Assignee(s): Alcon Laboratories, Inc. (Fort Worth, TX)

  Patent Number: 5,637,497

  Date filed: June 28, 1995

  Abstract: A lens storage container having an interior coated with an enzymatic cleaning composition useful for cleaning and disinfecting contact lenses.

  Excerpt(s): The present invention relates to a method of storing contact lenses and more particularly to a method for cleaning and disinfecting contact lenses.... Numerous methods have been previously described for cleaning and disinfecting contact lenses. Prior art cleaning methods include the use of surfactant and/or proteolytic enzymes. Prior art disinfection methods include the use of heat and/or chemical agents such as hydrogen peroxide, polymeric biguanides, polymeric quaternary ammonium compounds, thimerosal, and benzalkonium chloride. The prior art also describes the simultaneous cleaning and disinfecting of contact lenses by contacting the lens in an aqueous medium containing both an enzyme, and an antimicrobial agent.... The commercially available prior art enzyme/disinfectant combinations use a solid enzymatic cleaning composition, usually packaged separately from the aqueous disinfectant and in tablet form. In use, the tablet must be placed in a vial and dissolved in the disinfectant. This cumbersome, multi-step procedure compromises patient compliance and as a result, surveys have shown that less than half of the contact lenses wearers enzymatically clean his or her contact lenses on a regular basis.

  Web site: http://www.delphion.com/details?pn=US05637497__

- **Apparatus and method for cleaning extended wear soft contact lenses**

  Inventor(s): Grondin, deceased; Edward A. (P.O. Box 4368, late of Dalton, GA), Grondin, executrix; by Carol F. (P.O. Box 4368, Dalton, GA 30721)

  Assignee(s): none reported

  Patent Number: 5,234,010

  Date filed: October 29, 1990

  Abstract: A device for cleaning extended wear soft contact lenses using liquid cleaning media is provided having a closed vessel for containing the liquid at a suitable level to wash the lenses which are rotated about a vertical axis in an upright position across the path of rotation with a swirling action imparted to the liquid with limited turbulence resulting in a gentle effective cleaning action.

  Excerpt(s): Mechanical apparatus has been provided for cleaning hard lenses in a liquid cleaning medium utilizing separate baskets arranged in a horizontal alignment in the path of liquid rotation through the use of external power operated means in the form of

a magnetic drive including rotation through a magnetic coupling to the lenses baskets. Such apparatus is not effective for use in cleaning soft contact lenses. Since the soft lenses are presented in a sidewise position to the liquid, there is minimal resistance to rapid rotation producing excessive turbulence such as would damage a soft lens of the extended wear variety. Other United States patents which illustrate apparatus for cleaning objects in liquid include the following: 692,663, 1,963,563; 2,150,560; 2,277,919; 2,414,971; 2,721,567; and 3,297,309.... Accordingly, it is an important object of this invention to provide a mechanical device for effectively cleaning soft contact lenses utilizing a gentle scrubbing action of liquid to which a limited turbulence has been imparted. It has been found that the apparatus and method of the present invention are effective in removing the deposits which develop upon extended use with the soft contact lenses of the extended wear variety whether such deposits are protein, mucous or calcium. It is believed that such impurities or deposits within the pores of capillary tubes form interstices extending from the back to the front of the soft contact lenses. It is believed such tubes become clogged by impurities and such deposits over an extended period of use. It is contemplated that liquids such as normally used to clean soft contact lenses be employed with the apparatus hereof including enzyme applications, disinfectant applications and the final saline wash to purge the pores of the lenses of deposits and chemicals utilized in previous applications.... Apparatus and method has been provided for cleaning soft extended wear contact lenses wherein external power operated means rotate a pair of vertically supported baskets for presenting the lenses at right angles to the liquid as the lenses are rotated in a horizontal plane within the liquid.

Web site: http://www.delphion.com/details?pn=US05234010__

- **Apparatus and method for custom tinting soft contact lenses by dispenser of lenses**

  Inventor(s): Johnson; Carl S. (2611 Telegraph Avenue, Oakland, CA 94612)

  Assignee(s): none reported

  Patent Number: 4,777,684

  Date filed: August 12, 1987

  Abstract: Presented is a method and apparatus for custom tinting soft contact lenses in the dispensing office prior to dispensing such lenses to the wearer, or even after they have been dispensed and worn for a time. In the past, contact lenses have been tinted by mass production means by a very limited number of manufacturers. In one aspect, this invention presents a device that can be used by a dispensing optician, optometrist or ophthalmologist to custom tint soft contact lenses to the specification of the wearer while the wearer waits for the lenses to be tinted. In terms of structure, the apparatus comprises a hand-held device into which a soft contact lens may be deposited and sealed and subjected to the chemical reaction of an appropriate dye to tint the contact lens to the requisite color. The lens is held contained within the device for requisite time to secure adequate reaction of the dye stuff with the material from which the lens is manufactured, and subsequently the dye is flushed from the apparatus and the lens removed.

  Excerpt(s): This invention relates to soft contact lenses, and particularly to a method and apparatus for tinting such soft contact lenses within the dispensing office, or in soft contact lens manufacturing facilities.... The search of the prior art has revealed the existence of the following U.S. Pat. Nos. which are believed to be the most pertinent related to the subject matter of this application: 2,241,415; 3,034,403; 3,171,869; 3,557,261; 3,679,504; 3,992,563; 4,157,892; 4,252,421; 4,349,470; 4,4,6,814; 4,447,474; 4,460,523;

4,468,229; 4,472,327; 4,494,954; 4,518,390.... Out of this group of patents, only U.S. Pat. Nos. 2,241,415; 3,557,261; 4,447,474; 4,460,523; 4,472,327 and 4,518,390 appear to show any type of structure for tinting existing contact lenses, and it does not appear from these patents that the structures illustrated in these patents in any way conflict with the method and apparatus disclosed and claimed herein by applicant. The remaining patents mentioned above relate to various methods and processes, some of which may produce the same end result produced by applicant through the practice of his invention disclosed herein, but which differ substantially from applicant's method and apparatus.

Web site: http://www.delphion.com/details?pn=US04777684__

- **Apparatus and method for determining contact lenses**

  Inventor(s): van Gelderen; Herman (Doornikestraat 4, The Hague, NL)

  Assignee(s): none reported

  Patent Number: RE37,196

  Date filed: May 7, 1997

  Abstract: Apparatus and method for determining a prescription for contact lenses, comprising in cooperative combination a refractometer and a keratometer, both hooked up to a computer, comprising a program for processing the results obtained from said meters in any desired sequence, optionally supplemented with personal data and the results of a tono-meter and/or vertexmeter in optional sequence. The apparatus and method are also suitable for detecting any requirement for readjustment of the lenses after a period of time of use, comparing the new data with the data stored in the memory of the computer, and providing any readjustment required.

  Excerpt(s): The invention relates to an apparatus and method for determining a prescription for contact lenses. Both soft and hard lenses are known, which may optionally be permeable. However, it was hitherto not possible to determine the appropriate lens accurately by individuals without expertise in the field of measuring and calculating prescription for lenses. The present invention provides a solution to this problem.... For determining a prescription contact lenses the present invention provides an apparatus and method wherein individuals without special education other than operating the relevant apparatus, are able to determine the appropriate prescription contact lenses. In determining the prescription for a lens, in the present case a contact lens, a considerable number of special circumstances may play a part in determining the appropriate lens to be used. In that respect it can be mentioned by way of example the history of the eye involved, including possible eye-operations, the possibility of allergies, any use of medicines, special conditions in the workplace, such as fumes, air-conditioning, chemicals and smoking, and any medical indication which might prohibit the use of contact lenses. The environmental conditions are of special importance for gas-permeable lenses. In order to collect this information, a list of pertinent questions should be filled out by checking with the client. These data should be stored for determining what type of lens should be used.... The apparatus according to the invention comprises in cooperation a refractometer, a keratometer, a vertexmeter, (a meter for determining the strength of spectacle glasses) and a tono-meter for determining the pressure in an eye-ball. In addition a slit lamp can be used for observation of the lens, conjuctiva and blood vessels in order to obtain possible contra-incications. These measurements can be made automatically or manually. Hitherto the data thus obtained were used for calculation of the prescription for the lens. According

to the present invention the data from the instruments used are fed automatically into a computer, wherein the data obtained, together with the special information mentioned in the previous paragraph are combined for obtaining the appropriate details of the lens required.

Web site: http://www.delphion.com/details?pn=US0RE37196__

- **Apparatus and method for tinting hydrophilic contact lenses**

  Inventor(s): Claussen; Eric R. (Denver, CO), Hoffman; William C. (Denver, CO), Smith; Lawrence A. (Denver, CO)

  Assignee(s): Optatint, Inc. (Englewood, CO)

  Patent Number: 4,733,959

  Date filed: May 1, 1985

  Abstract: An apparatus and method for tinting hydrophilic contact lenses wherein a base having at least one post whose remote end is shaped for receiving and positioning a hydrophilic contact lens, and at least one cap which when placed in communication with the post and the lens masks one or more predetermined areas of the lens, is assembled with a lens positioned on the end of a post which is then capped. The assembly is immersed in a dye bath and then removed therefrom when the lens has attained the desired color, after which the assembly is placed in a fixing solution such that the lens is tinted permanently and fluid transport and oxygen permeability are unaffected.

  Excerpt(s): The invention relates to an apparatus and method for tinting hydrophilic contact lenses. A hydrated finished lens is placed in a holding device constructed to mask areas of the lens that are not to be tinted. The holding device containing the lens is then placed in a dye bath and the lens is tinted using reactive or vat dyes. Any number of lenses can be tinted at one time.... Tinted contact lenses offer several advantages over clear contact lenses. Contact lenses can be tinted to enhance or even change the color of the iris, which is often desirable since contact lenses are primarily worn for cosmetic reasons. Tinting a lens can also serve as a location aid, making it easier to locate a decentered lens on the eye or to find a lens if it has been dropped, lost or misplaced. Tinted lenses reduce the annoying glare often experienced with clear lenses out of doors. There are also several therapeutic reasons to tint a lens. An opaque black lens can also be used as a sleep aid for people with sleeping problems. Lenses can be tinted to absorb ultra-violet light to prevent retinal damage after surgery. Tinted lenses also may be used to cover unsightly eye injuries. U.S. Pat. No. 3,586,423 describes a tinted lens that enables color-blind individuals to distinguish colors.... The first contact lenses made of polymethyl methacrylate (hard lenses) were tinted by dissolving or suspending dyes or pigments in the monomer or pre-polymer before polymerization. Since hard lenses are small (8.0-9.0 mm diameter) the entire lens can be tinted without being visible on the sclera. Soft (hydrophilic) lenses, however, are much larger (14 mm diameter) so that the entire lens cannot be tinted without making the eye appear strange. For a tinted lens to appear normal, the tinted zone cannot be larger than the iris (11 mm diameter). Thus, soft lenses must be tinted only in the central area (11 mm diameter) and the periphery must be left clear. Some practitioners also prefer to have the center (5 mm diameter) directly over the pupil left clear.

  Web site: http://www.delphion.com/details?pn=US04733959__

- **Apparatus for and method of sterilizing medical and laboratory devices and cleaning contaminants from contact lenses**

  Inventor(s): Rehmeyer; Theodore H. (3411 Scarborough Dr., Winston-Salem, NC 27106), Shultz; James R. (1267 Wiltshire Rd., York, PA 17403)

  Assignee(s): none reported

  Patent Number: 5,783,147

  Date filed: July 16, 1996

  Abstract: Apparatus for and method of sterilizing medical and laboratory devices and cleaning contaminants from contact lenses at low voltages, the apparatus including a housing carrying a sterilizing and cleaning well, electrodes, appropriate controls and a power source and the method comprising the steps of positioning a contact lens and an adsorbent so that the adsorbent is disposed between the contact lens and an electric current source, immersing the contact lens, the adsorbent, and the current source in a saline or other appropriate solution, and then applying electric current from the power source through the adsorbent and only over the surface of the contact lens so that contaminants carried by the contact lens migrate to the adsorbent.

  Excerpt(s): The present invention relates generally to sterilizing medical and laboratory devices and to sterilizing and cleaning contact lenses and more particularly to an apparatus for sterilizing medical and laboratory devices and an apparatus and method for cleaning contaminants from contact lenses.... Sterilization of medical instruments used in the offices of doctors, dentists and veterinarians and of equipment used by laboratories is usually accomplished by the use of autoclaves wherein those items are subjected to intense heat to kill all bacteria that may be associated with them. Autoclaves come in varying sizes to accommodate instruments of varying sizes and are sometimes complex and usually expensive. Utilizing such sterilization equipment involves high power consumption as well as lengthy time exposure of the instruments within the equipment to assure complete sterilization.... In some instances, equipment of this nature can be cleaned chemically by spraying with appropriate disinfectants to remove bacteria associated therewith. Again, the compounds utilized to effect such cleaning are expensive and involve lengthy procedures during their application to again ensure complete sterilization of the devices.

  Web site: http://www.delphion.com/details?pn=US05783147__

- **Apparatus for applying and working a cleansing preparation on contact lenses**

  Inventor(s): Johnston; Calvin M. (4440 Central Ave., Apt. #6, Charlotte, NC 28205)

  Assignee(s): none reported

  Patent Number: 4,504,994

  Date filed: January 5, 1984

  Abstract: An apparatus for cleaning conventional contact lenses with a suitable cleansing preparation including a body formed of a soft, slightly abrasive material and having a recessed area formed therein for receiving a contact lens. A handle assembly includes a projecting portion of the same or a similar soft, slightly abrasive material which can be inserted in the recess to engage the lens and manipulate it to be rubbed on its inward and outward surfaces by the surface of the body recess and the surface of the handle projecting portion. The cleaning operation is carried out by first applying the

cleaning preparation to the concave recessed surface of the body and to the convex projecting portion of the handle assembly, placing the lens in the recessed area 22 and inserting the projecting portion of the handle assembly therein and manipulating the lens against the surfaces to apply the cleaning preparation to the lens.

Excerpt(s): The present invention relates generally to the cleaning of contact lenses and more particularly to apparatus designed therefor.... Contact lenses for wearing in direct contact with the cornea of one's eyes as an alternative to eyeglasses for the correction of visual disorders are well-known. For a number of years, such lenses have conventionally been constructed of a relatively rigid, hydrophobic material, commonly called "hard" contact lenses. In recent years, contact lenses have also been constructed of hydrophilic plastic materials which are substantially flexible and pliant when saturated with water, commonly called "soft" contact lenses. Both types of contact lenses are in widespread conventional use. However, with the advent of the so-called soft contact lenses, such lenses have become increasingly popular due to the greater comfort in the wearing thereof. Both types of lenses require periodic cleaning, usually daily, with a special detergent preparation. Conventionally, the cleaning of contact lenses is usually carried out manually by holding each lens in the palm of one's hand, applying the cleaning preparation thereto and manually working the preparation onto the lens with the forefinger of the other hand. As will be recognized and appreciated by those knowledgeable in the art, this manual operation can provide substantial difficulty when carried out with soft contact lenses and is generally considered an aggravating necessity attendant to the use of contact lenses. Accordingly, one existing problem with this cleaning method is that often it is performed haphazardly with poor cleaning results. Furthermore, the manual handling of the lenses creates a danger of damaging them.... It is an object of the present invention to provide an apparatus particularly adapted for facilitating the cleansing of contact lenses of all types with only limited manual handling and manipulation thereof being required.

Web site: http://www.delphion.com/details?pn=US04504994__

- **Apparatus for asepticizing soft contact lenses at high temperature**

  Inventor(s): Beers; Charles J. (1818 Cortez Rd. W., No. 101C, Bradenton, FL 33507)

  Assignee(s): none reported

  Patent Number: 4,080,167

  Date filed: October 22, 1976

  Abstract: Apparatus for the asepticizing by heat of soft contact lenses, wherein the lenses are placed in an autoclave which through automatic action raises and maintains them above a temperature level and for a duration to kill the germs, bacteria, and viruses which might otherwise be harmful to the wearer of such lenses.

  Excerpt(s): This invention relates to the field of optics. More particularly to the use of soft contact lenses to improve human sight and most particularly to an apparatus for killing germs, bacteria, and viruses which might contaminate such lenses.... Soft contact lenses are made from a hydrophilic material. Hence, they absorb liquids, particularly human tears. This, plus their being held in contact with the eye and thus being sustained at the external temperature of the eye makes them a potential source of infection by absorption and growth of pathogenic microorganisms. The lenses should be made clean and aseptic between wearing intervals.... Presently, users of soft contact lenses asepticise them by one of two methods. One method is to immerse them in an antiseptic solution;

hydrogen peroxide, for example. After soaking in the antiseptic, the lenses are repeatedly immersed in sterile water or saline solutions until enough of the antiseptic is removed from the lenses as to pose only a minor hazard to the human eye. A second method generally proceeds as follows: the soft contact lenses are immersed in a saline solution inside a container. The container is then sealed against fluid flow. The container is next immersed in steam from water boiling in an unsealed vessel. The temperature of the steam on the outside of the lens-holding container is generally at or below 212.degree. F., depending on elevation. The walls of the sealed container act as insulating barriers with respect to heat flow. Thus, the temperature of the lenses and saline solution inside the container rises at a moderate and ever-decreasing rate from ambient (the temperature of the lenses, saline solution, and container at the start of the asepticising cycle) towards the temperature of the steam or boiling water. The presently-used devices which create the steam on the outside of the container are designed and constructed to shut themselves off automatically before the temperature inside the lens-holding container reaches 212.degree. F. The walls of both the lens-holding container and of the steam-generating vessel are only fair (not good) insulating barriers to heat flow. Thus, after the steam-generating unit has been automatically shut off, heat flows out from the lenses and saline solution. The temperature of the lenses decreases at a moderate though ever-decreasing rate towards ambient. This method of asepticising soft contact lenses subjects them to a temperature of less than 212.degree. F. as a peak temperature. Also the lenses are maintained at temperatures near this peak temperature for only a short period of time. When used at places of high elevation above sea level and/or conditions of low ambient temperature, this method of asepticising soft contact lenses fails to subject them to a high enough temperature, sustained for a sufficient duration, to kill many of the pathogenic microorganisms with which they may become contaminated. Also, since these present devices which use heat do so by boiling water in an unsealed vessel, they provide an opportunity for injury to anyone who may be contacted by the boiling water or steam during their operation.

Web site: http://www.delphion.com/details?pn=US04080167__

- **Apparatus for cleaning and sterilizing contact lenses**

  Inventor(s): Barrau; Bernard (10 Rue Delcasse, 09000 Foix, FR), Bielsa; Francis (Goutte Madere, 09000 Pailhes, FR)

  Assignee(s): none reported

  Patent Number: 4,816,232

  Date filed: September 29, 1986

  Abstract: The present invention relates to an apparatus for cleaning and sterilizing objects for example contact lenses, of the type of those comprising two containers, one for the sterilizing solution and the other for the neutralizing solution and a timer which actuates at the end of a predetermined interval a mechanical movement for transferring the contact lenses already sterilized in the first container during the predetermined interval, the apparatus being characterized by a movable device which carries and maintains the case for the lenses during their transfer from the sterilizing solution to the neutralizing solution.

  Excerpt(s): The present invention concerns an apparatus for cleaning and sterilizing objects, for example contact lenses. It concerns more particularly an apparatus which, starting from a predetermined soaking interval of the said lenses in a sterilizing solution, transfers them into a neutralizing solution so as to reduce the residue from the

first solution and permit them to be conveniently stored in anticipation of their use.... For daily chemical sterilization by an oxidizing system, the contact lenses are placed for a predetermined interval in a sterilizing solution (for example hydrogen peroxide). At the end of this interval the sterilization is complete, and they are transferred into a neutralizing solution: they are allowed to soak for at least the time recommended by the manufacturer of the products. After this time, the wearer may put on his lenses which are thus antiseptically cleaned and preserved in a hydrated state.... The interval during which the contact lenses remain in the sterilizing solution must be sufficient for complete sterilization to take place. On the other hand, unnecessary extension of the said interval helps to cause an ever-growing number of active molecules to cling on the surface and within the said lenses. This necessitates a longer interval for neutralizing these molecules. Once a week, so as to remove protein deposits on the lenses, they are soaked for a predetermined time in a solution containing deproteinizing agents. Next, either they are transferred to a rinsing solution, or the previously described daily cleaning cycle is resumed.

Web site: http://www.delphion.com/details?pn=US04816232__

- **Apparatus for custom tinting soft contact lenses by dispenser of lenses**

  Inventor(s): Johnson; Carl S. (2611 Telegraph Ave., Oakland, CA 94612)

  Assignee(s): none reported

  Patent Number: 4,705,370

  Date filed: February 27, 1986

  Abstract: Presented is a method and apparatus for custom tinting soft contact lenses in the dispensing office prior to dispensing such lenses to the wearer, or even after they have been dispensed and worn for a time. In the past, contact lenses have been tinted by mass production means by a very limited number of manufacturers. In one aspect, this invention presents a device that can be used by a dispensing optician, optometrist or ophthalmologist to custom tint soft contact lenses to the specification of the wearer while the wearer waits for the lenses to be tinted. In terms of structure, the apparatus comprises a hand-held device into which a soft contact lens may be deposited and sealed and subjected to the chemical reaction of an appropriate dye to tint the contact lens to the requisite color. The lens is held contained within the device for a requisite time to secure adequate reaction of the dye stuff with the material from which the lens is manufactured, and subsequently the dye is flushed from the apparatus and the lens removed.

  Excerpt(s): 1. Field of the Invention.... This invention relates to soft contact lenses, and particularly to a method and apparatus for tinting such soft contact lenses within the dispensing office, or in soft contact lens manufacturing facilities.... The search of the prior art has revealed the existence of the following U.S. patents which are believed to be the most pertinent related to the subject matter of this application Ser. Nos: 2,241,415; 3,034,403; 3,171,869; 3,557,261; 3,679,504; 3,992,563; 4,157,892; 4,252,421; 4,349,470; 4,4,6,814; 4,447,474; 4,460,523; 4,468,229; 4,472,327; 4,494,954; 4,518,390.

  Web site: http://www.delphion.com/details?pn=US04705370__

- **Apparatus for disinfecting contact lenses**

  Inventor(s): Bruun-Jensen; J.o slashed.rgen (Slagelse, DK)

  Assignee(s): Synoptik A/S (Rodovre, DK)

  Patent Number: 5,723,096

  Date filed: April 29, 1996

  Abstract: In an apparatus for disinfecting contact lenses (19, 20), said contact lenses are immersed in a reaction vessel (1) with a 3% H.sub.2 O.sub.2 -solution (21). The contact lenses (19, 20) are placed in a lens holder (13, 14) on a frame (6) which also comprises a catalyst (9) in a compartment (7), to which the H.sub.2 O.sub.2 -solution has access. The catalyst (9) neutralizes the H.sub.2 O.sub.2 -solution, but said neutralization is delayed at first by the developed oxygen being collected and maintained in contact with the surface of an apertured system of spokes (10; 10a to 10h) of the catalyst (9) in such a manner that the disinfecting effect is improved.

  Excerpt(s): The invention relates to an apparatus of the type described in the preamble of claim 1.... Contact lenses must be disinfected by the user when they are removed from the eyes. The most well-known disinfecting system is based on hydrogen peroxide H.sub.2 O.sub.2, which in the highly purified form and in acid environment is highly destructive to all microorganisms. The hydrogen peroxide can be neutralized into oxygen and water by means of either a catalyst system or an enzyme system in such a manner that the hydrogen peroxide is removed from the contact lenses before said lenses are to be used again.... The apparatus of the type stated in the preamble of claim 1 comprises as indicated in said preamble a catalyst system for decomposing or neutralizing the hydrogen peroxide in the disinfecting liquid.

  Web site: http://www.delphion.com/details?pn=US05723096__

- **Apparatus for disinfecting contact lenses having improved vent means**

  Inventor(s): Alvord; Larry A. (Lawrenceville, GA), McCoy; Robert F. (Maplewood, NJ)

  Assignee(s): Ciba Geigy Corporation (Tarrytown, NY)

  Patent Number: 5,558,846

  Date filed: December 5, 1994

  Abstract: An ophthalmic lens disinfection apparatus, including a container and a mating cap, she apparatus having an improved seal and vent means for venting gas generated within the apparatus. The vent means is an integral part of the disinfection apparatus which allows venting of gas when internal pressure increases, while maintaining a seal which is substantially gas and liquid-impermeable at other times. The seal is defined by the interference mating of a flexible periphery on a container with a rigid mating rim on a cap. The apparatus is particularly useful in the disinfection of contact lenses with hydrogen peroxide in which the excess peroxide is decomposed into water and oxygen.

  Excerpt(s): This invention relates broadly to ophthalmic lens treatment technology. More specifically, this invention relates to contact lens disinfecting devices in which gas is liberated during the disinfection process.... Contact lenses provide the consumer with an exceptionally convenient alternative to spectacles or glasses, a more archaic form of vision correction. However, proper maintenance of contact lenses require periodic sterilizing or disinfecting to eliminate harmful bacteria or fungi, and cleansing to remove deposits such as proteins or lipids which adhere to the lens. In order to clean

and/or disinfect contact lenses, a wide variety of devices have been developed.... A particularly efficacious method of disinfecting contact lenses is by a chemical treatment of the lenses with a hydrogen peroxide solution, as described in U.S. Pat. No. 3,912,451, issued to Gaglia, Jr., Oct. 14, 1975. In a typical lens disinfecting apparatus, contact lenses are placed in hydrogen peroxide solution inside a container. The container is sealed (e.g., by threads on the container mating with threads on a cap) for a predetermined period of time to sufficiently disinfect the lenses, with the seat preventing liquid spillage resulting from container movement.

Web site: http://www.delphion.com/details?pn=US05558846__

- **Apparatus for disinfecting contact lenses using microwave energy**

  Inventor(s): Stepanski; Stephen F. (Rochester, NY), Wildman; Kelvin H. (Webster, NY)

  Assignee(s): Bausch & Lomb Incorporated (Rochester, NY)

  Patent Number: 5,164,166

  Date filed: April 20, 1990

  Abstract: An apparatus for disinfecting contact lenses by use of microwave energy is disclosed wherein a disinfecting fluid is stored in a first chamber and transferred to a second compartment when exposed to microwave energy. The second compartment holds the lenses to be disinfected and is shielded by a microwave deflecting substance.

  Excerpt(s): This invention relates to disinfecting contact lenses and, more particularly, relates to a method and apparatus for disinfecting contact lenses using microwave energy.... During the normal course of wearing contact lenses, various debris, organic matter, and microorganisms have a tendency to deposit and/or build up on lens surfaces. Contact lenses, especially those made from hydrophilic materials, must be continuously disinfected to kill any harmful microorganisms that may be present on or grow on the lenses. If the harmful microorganisms are not controlled, corneal infections are a possibility.... Accordingly, a number of methods for disinfecting contact lenses have been used such as the use of elevated temperatures, oxidative chemicals and antimicrobial agents. This invention disinfects through the use of elevated temperatures.

  Web site: http://www.delphion.com/details?pn=US05164166__

- **Apparatus for disinfection of hydrophilic contact lenses**

  Inventor(s): Kadlecik; John (Macedon, NY), Manning; Wayne R. (Victor, NY)

  Assignee(s): Bausch & Lomb Incorporated (Rochester, NY)

  Patent Number: 4,044,226

  Date filed: August 30, 1976

  Abstract: Process and apparatus for disinfection of hydrophilic contact lenses by controlled exposure of the lenses to heat. In the apparatus is a compartment formed by a heat storage-transfer combination. The compartment forming combination is heated by means of a heating element. The heat is transferred to a contact lens carrying case received in the compartment. The heat is maintained at temperatures and for a period of time sufficient to disinfect hydrophilic contact lenses contained in the carrying case.

Excerpt(s): This invention relates to apparatus for and a process of disinfecting hydrophilic contact lenses. More particularly, this invention relates to a portable apparatus for disinfecting hydrophilic contact lenses.... Hydrophilic contact lenses, being water absorbant, require daily care by the patient in order to destroy pathogenic microorganisms which accumulate on and can contaminate the lenses. Daily care, i.e. disinfection, is necessary, for the microorganisms are a potential source of eye infection if they are not destroyed.... A number of methods have been suggested for disinfecting hydrophilic lenses such as, for example, boiling the lenses immersed in a saline solution for at least 10 minutes at +100.degree. C, or chemically treating the lenses. Boiling, which requires the attention of the patient is a time consuming process and the high temperature treatment can, with the passage of time, have adverse affects upon the lens. Chemical treatment requires the utmost care since after treatment the chemicals must be properly and thoroughly flushed from the lens.

Web site: http://www.delphion.com/details?pn=US04044226__

- **Apparatus for heat treatment, particularly the asepticization, of contact lenses**

  Inventor(s): Rocher; Pierre M. (36, rue de Picpus, 75012 Paris, FR), Robin; Jacques B. (5, Allee de Flandre, 03200 Vichy, FR)

  Assignee(s): none reported

  Patent Number: 4,329,568

  Date filed: November 6, 1979

  Abstract: An apparatus for heat treatment (particularly asepticization) of contact lenses. The apparatus comprises a box having a housing adapted to receive a case for contact lenses and includes an electrical circuit comprising a power supply and at least one heating unit, with the heating unit having a heating resistor and a heat-sensitive switching device. The apparatus is characterized in that it comprises an electronic voltage threshold detection and programmed control.

  Excerpt(s): The present invention relates to an apparatus for heat treatment, particularly the asepticization, of contact lenses.... at least one heating unit.... In another type of asepticizer, the heating unit is formed by a bath of conducting water, through which flows the electric current. Under the effect of the current passing therethrough, the bath of water is brought to, then maintained at, boiling point. The case fitted out with lenses which is immersed in this bath of water or in the steam which is released therefrom is then brought to a temperature close to 100.degree. C.

  Web site: http://www.delphion.com/details?pn=US04329568__

- **Apparatus for hydrating soft contact lenses**

  Inventor(s): Andersen; Finn T. (Vedbaek, DK), Bjerre; Kaj (Ballerup, DK), Christensen; Svend (Allinge, DK), Keene; Darren S. (Jacksonville, FL), Kindt-Larsen; Ture (Holte, DK), Newton; Timothy P. (Jacksonville, FL), Wang; Daniel T. (Jacksonville, FL), Widman; Michael F. (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: 5,476,111

  Date filed: June 10, 1994

Abstract: A device and method for high speed production rates in the hydration of soft contact lenses. Such device and method includes the use robotic transfer equipment to transfer contact lens molds containing contact lenses to and from a hydration station and a flushing station.

Excerpt(s): The present invention relates generally to the field of manufacturing ophthamalic lenses, especially molded, hydrophilic contact lenses, and more specifically, to a high speed automated method and apparatus for demolding and hydrating the lenses after polymerization.... The molding of hydrophilic contact lenses is disclosed in U.S. Pat. No. 4,495,313 to Larsen, U.S. Pat. No. 4,565,348 to Larsen, U.S. Pat. No. 4,640,489 to Larsen et al., U.S. Pat. No. 4,680,336 to Larsen et al., U.S. Pat. No. 4,889,664 to Larsen et al., and U.S. Pat. No. 5,039,459 to Larsen et al., all of which are assigned to the assignee of the present invention. This prior art discloses a contact lens production process wherein each lens is formed by sandwiching a monomer or a monomer mixture between a front curve (lower) mold section and a back curve (upper) mold section, carried in a 2.times.4 mold array. The monomer is polymerized, thus forming a lens, which is then removed from the mold sections and further treated in a hydration bath and packaged for consumer use. During polymerization, particularly of the hydrogels, the lens tends to shrink. To reduce shrinkage, the monomer is polymerized in the presence of an inert diluent like boric acid ester as described in the above patents, which fills up the spaces in the hydrogel lens during polymerization. The diluent is subsequently exchanged for water during the hydration process.... The prior art process of exchanging the diluent for water and hydrating the lens has been very time consuming. The two part molds are opened and the lenses are assembled in large groups and placed in a leaching tank for several hours. The leach tank includes heated water, small amounts of surfactants and salts. When the lenses are inserted in the leach tank they immediately expand in the presence of water and release from the mold in which they were molded. The boric acid ester diluent hydrolizes into glycerol and boric acid leaving the water behind in the matrix of the lens to thus exchange diluent for water to hydrate the lens.

Web site: http://www.delphion.com/details?pn=US05476111__

- **Apparatus for inserting and removing contact lenses**

  Inventor(s): Overman; David C. (4525 W. Twain Ave., #262, Las Vegas, NV 89103)

  Assignee(s): none reported

  Patent Number: 4,193,622

  Date filed: June 15, 1978

  Abstract: Apparatus for inserting and removing contact lenses has an adjustable horizontal plate for receiving the user's forehead, and for orienting the user's eyes relative to lens holding members. The apparatus has two adjustable pivoted blocks, each having substantially vertical, separate lens-inserting and lens-removing devices which can be selectively rotated into operating position for insertion or removal. The forehead plate is aligned at an angle approximately 3.degree.-10.degree. below horizontal to facilitate insertion and removal.

  Excerpt(s): Within the past decade, the use of contact lenses has increased dramatically. Contact lenses are not only now a completely acceptable alternative to conventional frame-type eyeglasses, but many people also regard contact lenses as a preferred alternative because of relative safety and improved cosmetic appearance. With the

continuing improvement in lens quality, in addition to a wider public acceptance and willingness to put up with the initial inconvenience of adjusting to the lenses, practioners in the contact lens field have become increasingly skilled and experienced at proper fitting of the lenses. Accordingly, some users will purchase several different pairs of lenses having different colors to enhance their appearance in addition to correcting their vision.... Most users apply the lenses one-at-a-time by placing a wetting solution on the lens, placing the lens on the tip of a finger, and moving the lens toward the eye while holding the eyelids apart with the opposite hand. The lenses are removed by manipulating the eyelids in a manner that will lift the lens away from the eye, thereby releasing the capillary attraction which holds the lens to the eye.... While most contact lens users can insert and remove lenses in accordance with this technique, others have great difficulty in acclimating themselves to placing things on their eyes with their fingers. Others have problems in developing sufficient dexterity to place the lenses on their eyes without damaging or dropping them. Women who use makeup will frequently have small quantities of foreign substances on their hands or near their eyes which may coat the lens, thereby necessitating its removal for cleaning and reinsertion. An especially difficult insertion and removal problem is encountered by older people, especially those who have had cataract surgery, who have unsteady hands.

Web site: http://www.delphion.com/details?pn=US04193622__

- **Apparatus for measuring frontal power of contact lenses**

  Inventor(s): Tagnon; Luc Andre (Saint Mande, FR)

  Assignee(s): Essilor International (Compagnie Generale d'Optique) (Joinville Le Pont, FR)

  Patent Number: 3,985,445

  Date filed: June 28, 1974

  Abstract: Apparatus for measuring the frontal power of corneal contact lenses made of a somewhat hydrophilic material and having a predetermined index of refraction in a liquid having itself a predetermined index of refraction. This apparatus comprises a sighting optical system and a measuring optical system spaced from each other and having a common optical axis extending substantially vertically at least in the gap between said two optical systems. It further comprises a small cup disposed in said gap and filled with said liquid, the cup bottom comprising a fluid-tight window centered to said optical axis and means for supporting a contact lens in said liquid in a position centered to said optical axis.

  Excerpt(s): The present invention relates to an apparatus of the type referred to in the art as a frontofocometer, designed for measuring the frontal power of ophthalmic lenses and more particularly of "soft" corneal contact lenses, i.e. contact lenses made from a somewhat hydrophilic material having a predetermined index of refraction.... In the present specification the term "somewhat hydrophilic material" is used to designate not only hydrophilic materials such as ethylene-glycol monomethacrylate copolymers and ethylene-glycol dimethacrylate copolymers, but also materials which, while not being themselves of a hydrophilic nature, such as silicones, have either undergone a proper treatment for imparting hydrophilic properties thereto, at least to their surfaces, or been coated with a surface layer of hydrophilic material.... It is known that contact lenses of hydrophilic material or of a somewhat hydrophilic nature are preserved, outside the periods in which they are worn by the user, in a special liquid, more particularly a physiological serum or salt solution having properties akeen to those of lachrymal

liquor. This physiological salt solution keeps the contact lenses in a "swollen" condition and it is clear that the frontal power of a contact lens made of somewhat hydrophilic material varies according as it is swollen or not with physiological salt solution, or, in actual service, with a mixture of this physiological salt solution with lachrymal liquor. Under these conditions, it is clear that when it is desired to measure the frontal power of a contact lens of this character the measurement should be made when the lens conditions approximate as much as possible those obtaining when the lenses are worn by the user, i.e. in the swollen state, by using a liquid having an index of refraction very close to that of the lachrymal liquor, for example the physiological salt solution in which the lenses are normally stored.

Web site: http://www.delphion.com/details?pn=US03985445__

- **Apparatus for measuring the radii of contact lenses**

  Inventor(s): Wilms; Karl-Heinz (Emmering, DE)

  Assignee(s): Optische Werke G. Rodenstock (DE)

  Patent Number: 4,225,231

  Date filed: April 11, 1979

  Abstract: An apparatus for measuring the radii of contact lenses includes a holding arrangement for mounting a contact lens to be measured, and a mirror arrangement for directing a measuring beam emitted from an optical radius-measuring device to the contact lens to be measured. The optical radius-measuring device has an optical axis which is located at different height positions during measurement of the contact lens and the mirror arrangement is movable so that the optical axis of the radius-measuring device passes through the area of the center of curvature of the contact lens surface to be measured.

  Excerpt(s): The present invention relates to apparatus for measuring the radii of contact lenses.... For the perfect fitting of contact lenses, it is necessary to be able to measure the curvature of the concave side of the lens out to the marginal area, as well as in various intersecting directions. It should be possible for the individual fitting the lenses to perform the measurements with a conventional optical radius-measuring device such as an ophthalmometer.... Apparatus which can be fitted to an ophthalmometer is known for example, from German Offenlegungsschrift No. 22 02 560, wherein the contact lenses are held in a holder, the holder being rotatable about its axis and swivelable about a horizontal axis so as to enable measurement of the curved surfaces of the contact lenses out to the marginal area thereof. The lenses are measurable by the ophthalmometer using a fixed mirror tilted at 45.degree.. In such device, however, errors occur during measurement of soft contact lenses which can change their shape as a result of swivelling.

  Web site: http://www.delphion.com/details?pn=US04225231__

- **Apparatus for perforating contact lenses**

  Inventor(s): Marschalko; Cornell S. (3401 N. Emerson St., Arlington, VA 22207), Meszaros; George K. (4616 48th St., NW., Washington, DC 20016)

  Assignee(s): none reported

  Patent Number: 3,971,910

  Date filed: January 16, 1975

  Abstract: Apparatus for perforating contact lenses, including a laser, a hollow motor driven shaft connected to a vacuum pump for centering and holding the contact lens under the laser beam, crank means for adjusting the vertical and horizontal position of the contact lens with respect to the laser beam and automatic means for rotating said lens under said beam synchronously with the energization of said laser to effect production of a plurality of holes on said lens.

  Excerpt(s): This invention relates to apparatus and methods for forming holes in contact lenses.... It is well known to those skilled in the art of fitting contact lenses that providing sufficient oxygenation of the cornea has always been a significant problem. When the cornea receives insufficient oxygen because of the contact lens fitted thereover and gases cannot escape from the cornea because of the contact lens, edema or swelling of the cornea results. The predominant method of achieving the flow of oxygen to and gases from the space between the contact lens and the cornea is by creating a certain amount of standoff at the edge of the lens which allows an adequate tear flow around the lens. However, in certain cases even this standoff is insufficient to provide an adequate tear flow in these cases fenestrating or drilling of holes in the contact lens is the only practical solution to provide a sufficient tear flow. Thus, it is known to the prior art to mechanically drill one or more holes in the contact lens.... In order to insure comfort for those wearing contact lenses which had been drilled holes had to be polished and blended to the interior and exterior surfaces of the lens. This operation required delicate manipulations and a good deal of time which resulted in a substantial increase in cost for the contact lenses even if the number of holes was kept to a minimum.

  Web site: http://www.delphion.com/details?pn=US03971910__

- **Apparatus for sterilizing contact lenses**

  Inventor(s): Cerola; Joseph J. (Guntersville, AL), Perlaky; Steven C. (Arab, AL)

  Assignee(s): Ciba Vision Corporation (Duluth, GA)

  Patent Number: 5,196,174

  Date filed: December 21, 1990

  Abstract: Apparatus is provided for use in the sterilization of contact lenses or the like, wherein lenses are disposed within a sterilizing solution contained within a reaction vessel, which sterilizing solution is capable of being decomposed through contact with a catalytic agent. The apparatus comprises a reaction vessel capable of containing a sterilizing solution and comprising a container portion, a cover and structure for supporting an article in contact with sterilizing solution in the container. Further structure is provided for mounting a catalytic agent on the supporting structure such that the catalytic agent is removable for replacement by a user as the catalytic agent becomes exhausted in use. The mounting of the catalytic agent on the article supporting

structure prevents contact of the catalytic agent with the solution in the container until the article supporting structure with the contact lenses therein is placed in the solution in the container for beginning the sterilizing process, to thereby prevent premature breakdown of the sterilizing solution prior to the introduction of contact lenses for sterilization therein.

Excerpt(s): This invention relates to a chemical sterilization process for articles such as contact lenses. More particularly, the invention concerns an improved apparatus adapted to be employed in said chemical sterilization process.... The sterilization of contact lenses is currently done by a number of different processes. Some processes employ heat, either in a dry sterilization environment, or with a sterilized saline or similar solution. A further process has also been developed which employs an anti-microbial sterilizing solution such as hydrogen peroxide (H.sub.2 O.sub.2).... The present invention concerns an apparatus specifically designed for use with the latter (hydrogen peroxide) type of sterilization technique. One particularly useful method and apparatus is disclosed in prior U.S. Pat. No. 4,013,410, also assigned to the assignee of this application, to which reference is invited for background material concerning this type of sterilizing process.

Web site: http://www.delphion.com/details?pn=US05196174__

- **Apparatus for tallying the amount of time for which a pair of contact lenses have been worn**

  Inventor(s): Madden; Donna (40 Pearl St., Mystic, CT 06355)

  Assignee(s): none reported

  Patent Number: 6,038,997

  Date filed: September 17, 1997

  Abstract: In an apparatus for tallying the length of time for which a pair of disposable contact lenses have been worn, a contact lens case is retained by a resilient member against a support member. A counter defining indicia corresponding to intervals of time is coupled for rotation to the support member. The indicia can be selectively aligned with a reference mark defined by the support member, thereby displaying the amount of time for which a particular pair of contact lenses have been worn.

  Excerpt(s): The present invention relates generally to counting devices, and more particularly to an apparatus for tracking the wearable life left in a pair of disposable contact lenses.... To avoid potential eye infections resulting from bacteria build up on a lens surface, as well as degradation of a wearer's eyesight due to lens deterioration; persons who wear disposable contact lenses must keep track of the amount of time for which the lenses have been worn. However, depending on the manufacturer or the type of lens chosen, a pair of disposable contact lenses may have a wearable life of several weeks or even months. If one does not record the date of first use, as time passes it can become difficult to recall how long a particular pair of disposable lenses have been worn.... Even when the date of first use is recorded, if the record is not conveniently situated and consulted on a regular basis, it is still possible to lose track of the length of time for which a pair of lenses have been worn. For example, the date upon which a pair of disposable contact lens should be discarded could occur while the wearer is traveling. If the lens wearer has not taken a record of how long the contact lenses have been worn with him, it is possible that the wearer will forget to discard the lenses and continue to wear them.

Web site: http://www.delphion.com/details?pn=US06038997__

- **Apparatus for the care of contact lenses**

  Inventor(s): Thomas; Peter (Wuppertal, DE), Reitz; Hans-Joachim (Roesrath, DE), Schaab; Udo (Korschenbroich, DE), Wisotzki; Klaus-Dieter (Erkrath, DE)

  Assignee(s): Henkel Kommanditgesellschaft auf Aktien (Duesseldorf, DE)

  Patent Number: 4,784,167

  Date filed: July 6, 1987

  Abstract: Apparatus for the care of contact lenses is disclosed. The apparatus includes a container for a treatment liquid, a contact lens holder which fits into the container, and nozzles positioned in the container for spraying treatment liquid onto contact lenses supported by the contact lens holder and for agitating the treatment liquid.

  Excerpt(s): This invention relates to apparatus for the care of contact lenses including a contact lens holder immersible in a container of treatment liquid and having means for agitating the treatment liquid.... In known devices of this type (German Patent Publication No. OS 34 10 400 and U.S. Pat. No. 3,623,492), the treatment liquid is agitated by rotation of the contact lens holder, rotation being effected manually by means of a rotatably mounted cover and gearing between the cover and the contact lens holder. In this arrangement agitation or stirring of the treatment liquid is relatively limited and, for this reason, so is the washing of the contact lenses and the dissolution of any tablets or powders in the treatment liquid. Manual operation has proved unsatisfactory in practice.... Accordingly, it has been proposed in copending application Ser. No. 069,794 filed on July 7, 1987 by Thomas, which is herein incorporated by reference to agitate the treatment liquid using a cylindrical stirrer which surrounds the contact lens holder in the container for the treatment liquid--the contact lens holder and the stirrer in this case being arranged in a multiple-part housing with an electric motor and gearing for driving the stirrer in one part of the housing and a battery for powering the motor being arranged in another part of the housing.

  Web site: http://www.delphion.com/details?pn=US04784167__

- **Apparatus for the care of contact lenses**

  Inventor(s): Wisotzki; Klaus-Dieter (Erkrath, DE), Schaab; Udo (Korschenbroich, DE), Reitz; Hans-Joachim (Roesrath, DE), Orczech; Juergen (Ebersberg, DE)

  Assignee(s): Henkel Kommanditgesellschaft auf Aktien (Duesseldorf, DE)

  Patent Number: 4,852,591

  Date filed: July 6, 1987

  Abstract: A process and apparatus for the care of contact lenses in which the process comprises supporting contact lenses on a lens holder within a treatment container provided with a motor-driven stirrer and introducing into the container a liquid, e.g., salt water, and a two-component system including (1) a first component providing a peroxide-compound cleaning and sterilizing solution, preferably in solid form and (2) a second solid component containing a catalyst or reducing agent providing a neutralizing solution wherein the second component dissolution is delayed until after the first component has acted on the contact lenses, and wherein the action of both

components is effected under stirring; and the apparatus for practicing this process comprises a housing, a treatment compartment in the housing to hold a liquid, a lens holder removably supported in the compartment, a stirrer movably positioned in the housing which is separate from the lens holder and which extends into the compartment and drive means to move the stirrer and agitate the liquid in the compartment.

Excerpt(s): This invention relates to a process and apparatus for the care of contact lenses, wherein the lenses are treated in a liquid bath.... The increasing use of contact lenses has created an increasing demand for lens care processes that can be carried out by the contact lens user. Known processes for cleaning, disinfecting and sterilizing contact lenses which the user can perform at home or while traveling have the disadvantages of requiring relatively long treatment times of from twenty minutes to more than four hours, of exhibiting difficulty in handling the apparatus and/or of involving complicated procedures.... U.S. Pat. Nos. 4,009,777 and 4,444,307 and German Patent Publication No. OS 31 45 468, for example, describe containers for cleaning contact lenses comprising cup-like holders for the lenses that are usually mounted on a cover member. These containers differ from one another largely in the design of the cups and have the disadvantage that they do not include means for accelerating the cleaning process.

Web site: http://www.delphion.com/details?pn=US04852591__

- **Apparatus for the cleaning of contact lenses**

  Inventor(s): DiGangi; Joel D. (San Diego, CA), Ross; Kenneth L. (Redmond, WA)

  Assignee(s): Digangi and Ross (San Diego, CA)

  Patent Number: 4,852,592

  Date filed: August 23, 1988

  Abstract: A contact lens washer having a plurality of disposable solution containers for sequential cleaning cycles using daily cleaning solution, enzymatic, solution, disinfecting solution and saline/neutralizing solution. The containers are inserted into the contact lens washer in an inverted condition. A plurality of liquid released solenoids cause the solution containers to inject liquid into a cleaning chamber having a pair of contact lenses to be cleaned. The contact lenses are encased in a lens-encasing member which is agitated to enhance the cleaning capabilities of the contact lens washer. A timing cycle module provides sequential fluid supply both to and from the cleaning chamber and controls agitation of the lens-encasing member.

  Excerpt(s): The present invention relates generally to contact lens care and particularly to apparatus for care of contact lenses.... While soft contact lenses have added greatly to the comfort and convenience of corrected vision, the lenses are hydrophilic and as a result must be cleaned and disinfected regularly to prevent bacterial contamination To date, contact lens deposits are recognized as the most serious of problems to be overcome by lens care regimens. Soft contact lenses allow for growth of bacteria present in the eye and consequently may cause serious eye infection if bacterial growth is not prevented.... Two methods of sterilizing hydrophilic contact lenses are currently in practice. The thermal care method requires raising contact lenses to a high temperature to destroy any bacteria. Thermal sterilization devices are in use, but have been known to change the chemical composition of soft lenses, rendering them unwearable. Moreover, such devices accomplish no surfactant cleaning. The second method for sterilizing contact lenses is by non-thermal, or chemical, treatment. Nonthermal treatment requires

manually placing the lenses in a disinfectant for a period of time, typically ten to fifteen minutes, to carry out the sterilization process.

Web site: http://www.delphion.com/details?pn=US04852592__

- **Apparatus for the heat treatment of ophthalmic lenses, especially contact lenses**

  Inventor(s): Uftring; Winfried (Aleznau, DE), Bachmann; Theo (Heigenbrucken, DE), Geis; Helmut (Kleinostheim, DE), Haase; Lothar (Morsbach/Sieg, DE)

  Assignee(s): Ciba-Geigy Corporation (Ardsley, NY)

  Patent Number: 5,340,399

  Date filed: March 17, 1993

  Abstract: In an apparatus for the heat treatment of ophthalmic lenses, especially contact lenses, which comprises an approximately cylindrical housing of closed design having an inlet opening and an outlet opening, transport device for transporting the ophthalmic lenses located inside molds along an open transport path, which is arranged inside the housing and connects the inlet and the outlet opening, and heating device arranged inside the housing, the open transport path inside the housing is of an essentially spiral shape, and the heating device are arranged essentially above and below the transport path.

  Excerpt(s): The invention relates to an apparatus for the heat treatment of ophthalmic lenses, especially contact lenses.... The manufacture of ophthalmic lenses, especially contact lenses, includes in addition to a number of manufacturing steps, such as, for example, the production of casting moulds, the preparation of a monomeric mixture, the casting process, etc., also heat treatment steps. In many cases, for example, the polymerisation of the monomeric mixture introduced into the casting mould for the production of the ophthalmic lens is effected by introducing the filled mould into an oven-like receptacle and then carrying out the heat treatment. Lenses produced in that manner may be so-called semi-finished products which are shaped in further manufacturing steps to obtain the desired lenses, or alternatively may be contact lenses that are produced in a so-called one-step-casting process (full mould process).... In order to produce coloured contact lenses, for example iris contact lenses, an additional heat treatment step is required. In that step the contact lenses to be coloured are introduced into so-called dye moulds, and a particular volume of a dyestuff solution of the desired colour is added. In order to achieve permanent colouration of the contact lenses, the dye moulds containing the lenses and the dyestuff solution are then subjected to heat treatment for a predetermined period of time. After the heat treatment the coloured contact lenses can be removed and, if necessary, subjected to further treatment.

  Web site: http://www.delphion.com/details?pn=US05340399__

- **Apparatus for the removal of contact lenses**

  Inventor(s): Stockhorst; Holger (Grossostheim, DE), Lassig; Gunter (Obernburg, DE), Hagmann; Peter (Erlenbach am Main, DE)

  Assignee(s): Novartis AG (Basel, CH)

  Patent Number: 6,502,876

  Date filed: March 16, 2001

Abstract: The invention is based on the problem of increasing the distance between the gripper and the mould half whilst maintaining the gripping power, so as to avoid damage to the contact lenses and the mould half, and of enabling the gripper to be simply aligned in relation to the mould half. This is solved by the usage of a spacer which is placed between the mould half and-the gripper. The distance between the mould half and the gripper is thereby increased without reducing the gripping, strength. In this way, damage to the mould half or the contact lens is avoided, and alignment of the gripper to the mould half is simplified. Moreover, the invention enables flaws in the periphery of the contact lens to be noticed more easily, since owing to the greater flux acting on the contact lens, the latter undergoes greater expansion in the end region of the gripper, thereby enabling possible flaws to be discerned more easily.

Excerpt(s): The invention relates to an apparatus for removing contact lenses, especially from a mould half.... In an automatic manufacturing process for contact lenses, particularly disposable lenses that are manufactured in large unit numbers, it is necessary to automatically remove the contact lenses from a mould half. Contact lenses, which are to be manufactured economically in large unit numbers, are preferably manufactured by the so-called mould or full-mould process. In these processes, the lenses are manufactured into their final shape between two mould halves, so that there is no need to subsequently finish the surfaces of the lenses, nor to finish the edges. Mould processes are described for example in PCT patent application no. WO/87/04390 or in EP-A 0 367.513.... The contact lenses produced in this manner are moulded parts having little mechanical stability and a water content of more than 60% by weight. After manufacture, the lens is metrologically checked, then packaged and subjected to heat sterilisation at 121.degree. C. in an autoclave.

Web site: http://www.delphion.com/details?pn=US06502876__

- **Apparatus for tinting soft contact lenses**

Inventor(s): Ryder; Francis E. (Arab, AL), Williams; Fred E. (Arab, AL)

Assignee(s): Ryder International Corp. (Arab, AL), National Patent Development Corp. (New York, NY)

Patent Number: 4,632,055

Date filed: March 22, 1985

Abstract: An apparatus for tinting a soft contact lens which is received in a fixture including an inlet and an outlet for directing predetermined fluids therethrough for engagement with predetermined surfaces of the contact lens. The apparatus comprises a carrier for carrying the fixture in a predetermined orientation; a guide arrangement for defining a predetermined path of travel; a motive assembly for propelling the carrier along the predetermined path; and a plurality of fluid application stations arranged along the path, each fluid application station including a fluid release member. The guide track and the motive assembly cooperate for aligning the inlet of the fixture with each fluid release member sequentially as the carrier travels along the predetermined path, for delivering a quantity of fluid to the fixture and the contact lens therein. A method for tinting soft contact lenses comprises the steps of mounting a contact lens to a fixture including an inlet and an outlet for directing predetermined fluids therethrough for engagement with predetermined surfaces of the contact lens; mounting the fixture to a carrier in a predetermined orientation; guiding the carrier along a predetermined path of travel; arranging a plurality of fluid application stations along the predetermined

path, each fluid application station including a fluid release member; and further moving the carrier as it moves along said path in a direction for aligning the inlet of the fixture with each of the fluid release members, sequentially for delivering a quantity of fluid to the inlet.

Excerpt(s): This invention is directed generally to the tinting or coloration of contact lenses for human eyes, and more particularly to a novel apparatus for carrying out such tinting.... In recent years, the so-called "soft" contact lenses have met with widespread acceptance. Such soft contact lenses are manufactured from a hydrophilic plastic material; that is, they can absorb and retain water, and become soft and pliable upon absorption of water. They are therefore relatively comfortable for the user to wear and can be worn for relatively long periods of time.... A number of methods of coloring the central areas of contact lenses have been suggested, for example in U.S. Pat. No. 4,252,421 to Foley, Jr. However, the tinting or coloration of contact lenses is not a simple task. In this regard, it is important that the tinted or colored lens provide a natural appearance in the wearer's eye. Thus, the tinted lens should preferably have a clear central area, a colored intermediate area and a clear outer area so that the colored portion will not cover the sclera of the eye. However, in cases where it is desired to further reduce light transmission, the central portion may be colored or tinted as well. Generally then, it is desirable to be able to provide the lens with a circular and preferably annular tinted area surrounded by clear, untinted lens material, so as to generally correspond to the normal appearance of the eye.

Web site: http://www.delphion.com/details?pn=US04632055__

- **Apparatus for treating contact lenses and contact lens treating vessel for use therein**

  Inventor(s): Kamiya; Hideaki (Gifu, JP), Nakagawa; Makoto (Aichi, JP), Endo; Masashi (Gifu, JP), Yamauchi; Masakatsu (Kani, JP)

  Assignee(s): Tomei Sangyo Kabushiki Kaisha (Nagoya, JP)

  Patent Number: 5,283,053

  Date filed: October 21, 1992

  Abstract: A contact lens treating vessel equipped with an electromagnetic induction coil and a rectifier for converting an alternating current into a direct current, and an apparatus for treating contact lenses comprising a treating apparatus body for supplying electric power and the vessel which can be attached to or detached from the apparatus body, wherein the apparatus body is equipped with a magnet-generating coil and the vessel is equipped with an electromagnetic induction coil.

  Excerpt(s): The present invention relates to an apparatus for treating contact lenses and a contact lens treating vessel for use therein and, more particularly, to an apparatus for treating contact lenses, in which the contact lenses can be cleaned and sterilized by immersing the contact lenses in a treating solution for contact lenses and applying a direct current to the treating solution, and a contact lens treating vessel for use therein.... In order to disinfect a contact lens, there has been proposed an apparatus for disinfecting a contact lens by applying an electric current to an electrolyte solution through electrodes where the contact lens is immersed in the electrolyte solution to carry out the electrolysis of the electrolyte solution (Japanese Unexamined Patent Publication No. 68454/1981, Japanese Unexamined Patent Publication No. 130713/1981, Japanese Unexamined Utility Model Publication No. 189021/1985 and Japanese Unexamined Utility Model Publication No. 35023/1988).... A contact lens treating vessel

which is used in the above-mentioned apparatus is constructed so that the treating vessel can be attached to or detached from an apparatus body and the treating vessel in which the contact lens is stored can be a portable vessel.

Web site: http://www.delphion.com/details?pn=US05283053__

- **Apparatus with built-in heating device for disinfecting contact lenses**

  Inventor(s): Sundstrom; Staffan (Helsingborg, SE), Herlestam; Tore (Helsingborg, SE)

  Assignee(s): AB Leo (Helsingborg, SE)

  Patent Number: 4,341,948

  Date filed: February 2, 1981

  Abstract: Apparatus for disinfecting contact lenses by heating, comprising a reservoir designed for holding a liquid and having a tight lid together with a heating device for heating of liquid therein, wherein the reservoir comprises a raised middle part or bridge for dividing said reservoir into two separate chambers or wells, and having a built-in heating device for direct heating of the liquid in said chambers.

  Excerpt(s): The present invention relates to an apparatus for disinfecting contact lenses by heating, comprising a reservoir designed to hold a liquid, a heating device for heating of the liquid, and having a tight lid.... Soft contact lenses are usually disinfected either by short-term heating at a temperature over 80.degree. in an isotonic sodium chloride solution or by treatment at room temperature with such solution containing disinfecting chemical agents.... Disinfecting by heating is more advantageous from several points of view. A more reliable result is reached, and at the same time the risk of accumulating contamination, which might harm the eyes, in the lens material is avoided. This is especially important since disinfection of the lenses must normally be carried out once every 24 hours.

  Web site: http://www.delphion.com/details?pn=US04341948__

- **Arrangement for the care of contact lenses**

  Inventor(s): Muller-Lierheim; Wolfgang G. K. (Munchen, DE)

  Assignee(s): MDLE Medical Device Laboratories Europe GmbH (Memmingen, DE)

  Patent Number: 6,056,114

  Date filed: December 18, 1998

  Abstract: An arrangement is provided for the care of contact lenses. The arrangement has at least one cup-shaped container made of glass. An interior side of the container carries a platinum layer. The container is exchangeably insertable into a housing, and an H.sub.2 O.sub.2 care solution is chargeable into the container. A lid is connected in a gastight manner with the housing during closing.

  Excerpt(s): This invention relates to an arrangement for the care of contact lenses having at least one container made of glass. A platinum layer is applied to an interior side of the container, and an aqueous H.sub.2 O.sub.2 care solution can be filled into the container for sterilization and/or disinfection. A lid is provided for closing the container.... An arrangement of this type is known from German Patent Document DE 196 24 095 C1. In addition, as is known from German Patent Document DE 24 25 714 B2, contact lenses,

particularly soft contact lenses, can be sterilized by hydrogen peroxide in an aqueous solution such as a 3%-aqueous hydrogen peroxide solution. The hydrogen peroxide residue is decomposed by a decomposition catalyst into water and oxygen for removal. In this decomposition, the platinum layer in the container, which is known from German Patent Document DE 196 24 095 C1, acts as the catalyst. Gases are formed during the care of the contact lenses and the catalytic decomposition of the hydrogen peroxide.... An arrangement for the care of contact lenses of this type is also known from U.S. Pat. No. 4,889,693. In this arrangement, openings for the escape of the forming gas are provided in a lid which can be screwed onto a container. In an arrangement known from German Patent Document 32 30 231 A1, openings are provided in a container through which gas can escape. In an area of the openings, a covering is provided; this covering is permeable to steam but forms a blockage which is impermeable to liquid. It is known from British Patent Document GB 2 209 845 to provide a pressure control valve for the escape of forming gases in a container. The arrangement known from U.S. Pat. No. 4,996,027 has a sealing device provided between an upper edge of a container and a screwed-on lid. The sealing device is deformed when gas pressure is created so that excess gas can escape. In the known arrangements, the lids are screwed onto the container into which the aqueous H.sub.2 O.sub.2 care solution is filled. Liquid particles entrained during exiting of the gas appear toward the outside.

Web site: http://www.delphion.com/details?pn=US06056114__

- **Automated method and apparatus for hydrating soft contact lenses**

  Inventor(s): Keene; Darren Scott (Jacksonville, FL), Newton; Timothy Patrick (Jacksonville, FL), Wang; Daniel Tsu-Fang (Jacksonville, FL), Dolan; David (Jacksonville, FL), Imai; Kiyoshi (Urawa, JP), Yoshida; Katsuaki (Honzyo, JP), Christensen; Svend (Allinge, DK), Andersen; Finn Thrige (Vedbaek, DK), Kindt-Larsen; Ture (Holte, DK), Bjerre; Kaj (Vallensbaek Strand, DK), Fukuchi; Junichi (Toyko, JP), Byram; David (Bunnell, FL), Hall; Gary (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: 5,836,323

  Date filed: May 7, 1996

  Abstract: An automated means for hydrating a molded hydrophilic contact lens is provided in which a first robotic assembly removes a plurality of contact lens molds from a production line carrier, each of the lens molds having a contact lens adhered therein. The first robotic assembly transports the molds to a first staging area where the lens molds are sandwiched between a lens mold carrier and a top chamber plate to form a first hydration carrier. A first rotary transfer device then hands the first hydration carrier to a second robotic assembly which immerses the first hydration carrier in a hydration bath to hydrate the lens and to release the lens from the lens mold. While the lens is immersed in the hydration bath, each lens is transferred from its respective mold to a lens transfer means found within the top chamber plate. After a predetermined period of time, the second robotic assembly removes the first hydration carrier from the hydration bath and hands the hydration carrier off to a second rotary transfer device which rotates the first hydration carrier and aligns it for transfer to a third robotic assembly. The third robotic assembly then carries the top chamber plate and contact lenses through a series of steps in which the lens mold carrier and lens molds are removed from the top chamber plate. The lenses carried on the lens transfer means are then flushed and transported for assembly with a hydration base member to form a

second hydration carrier for processing the lens in subsequent extraction stations. The second hydration carrier is then transported through a plurality of flushing or extraction stations wherein fresh deionized water is introduced into the hydration chambers at each hydration station to flush leachable substances from the hydration chamber. At each flushing station, fresh deionized water is introduced into the hydration chamber to remove previously extracted impurities and the products of hydrolysis. A final robotic dis-assembly device separates the top chamber plate and lens transfer means from the hydration base member, to provide fully hydrated lenses in a concave lens holding means ready for transfer to inspection and packaging stations.

Excerpt(s): The present invention relates generally to the field of manufacturing ophthamalic lenses, especially molded, hydrophilic contact lenses, and more specifically, to a high speed automated method and apparatus for demolding and hydrating the lenses after polymerization.... The molding of hydrophilic contact lenses is disclosed in U.S. Pat. No. 4,495,313 to Larsen, U.S. Pat. No. 4,565,348 to Larsen, U.S. Pat. No. 4,640,489 to Larsen et al., U.S. Pat. No. 4,680,336 to Larsen et al., U.S. Pat. No. 4,889,664 to Larsen et al., and U.S. Pat. No. 5,039,459 to Larsen et al., all of which are assigned to the assignee of the present invention. This prior art discloses a contact lens production process wherein each lens is formed by sandwiching a monomer or a monomer mixture between a front curve (lower) mold section and a back curve (upper) mold section, carried in a 2.times.4 mold array. The monomer is polymerized, thus forming a lens, which is then removed from the mold sections and further treated in a hydration bath and packaged for consumer use. During polymerization, particularly of the hydrogels, the lens tends to shrink. To reduce shrinkage, the monomer is polymerized in the presence of an inert diluent like boric acid ester as described in the above patents, which fills up the spaces in the hydrogel lens during polymerization. The diluent is subsequently exchanged for water during the hydration process.... The prior art process of exchanging the diluent for water and hydrating the lens has been very time consuming. The two part molds are opened and the lenses are assembled in large groups and placed in a leaching tank for several hours. The leach tank includes heated water, small amounts of surfactants and salts. When the lenses are inserted in the leach tank they immediately expand in the presence of water and release from the mold in which they were molded. The boric acid ester diluent hydrolyzes into glycerol and boric acid leaving the water behind in the matrix of the lens to thus exchange diluent for water to hydrate the lens.

Web site: http://www.delphion.com/details?pn=US05836323__

- **Automated method for hydrating soft contact lenses**

  Inventor(s): Andersen; Finn Thrige (Vedbaek, DK), Bjerre; Kaj (Ballerup, DK), Christensen; Svend (Allinge, DK), Keene; Darren Scott (Jacksonville, FL), Kindt-Larsen; Ture (Holte, DK), Newton; Timothy Patrick (Jacksonville, FL), Wang; Daniel Tsu-Fang (Jacksonville, FL), Widman; Michael Francis (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: 5,690,866

  Date filed: June 5, 1995

  Abstract: An automated method for high speed production rates in the hydration of soft contact lenses. The method includes the use of robotic transfer equipment to transfer contact lens molds containing contact lenses to and from a hydration station and a flushing station.

Excerpt(s): The present invention relates generally to the field of manufacturing ophthamalic lenses, especially molded, hydrophilic contact lenses, and more specifically, to a high speed automated method and apparatus for demolding and hydrating the lenses after polymerization.... The molding of hydrophilic contact lenses is disclosed in U.S. Pat. No. 4,495,313 to Larsen, U.S. Pat. No. 4,565,348 to Larsen, U.S. Pat. No. 4,640,489 to Larsen et al., U.S. Pat. No. 4,680,336 to Larsen et al., U.S. Pat. No. 4,889,664 to Larsen et al., and U.S. Pat. No. 5,039,459 to Larsen et al., all of which are assigned to the assignee of the present invention. This prior art discloses a contact lens production process wherein each lens is formed by sandwiching a monomer or a monomer mixture between a front curve (lower) mold section and a back curve (upper) mold section, carried in a 2.times.4 mold array. The monomer is polymerized, thus forming a lens, which is then removed from the mold sections and further treated in a hydration bath and packaged for consumer use. During polymerization, particularly of the hydrogels, the lens tends to shrink. To reduce shrinkage, the monomer is polymerized in the presence of an inert diluent like boric acid ester as described in the above patents, which fills up the spaces in the hydrogel lens during polymerization. The diluent is subsequently exchanged for water during the hydration process.... The prior art process of exchanging the diluent for water and hydrating the lens has been very time consuming. The two part molds are opened and the lenses are assembled in large groups and placed in a leaching tank for several hours. The leach tank includes heated water, small amounts of surfactants and salts. When the lenses are inserted in the leach tank they immediately expand in the presence of water and release from the mold in which they were molded. The boric acid ester diluent hydrolizes into glycerol and boric acid leaving the water behind in the matrix of the lens to thus exchange diluent for water to hydrate the lens.

Web site: http://www.delphion.com/details?pn=US05690866__

- **Bifocal contact lenses**

  Inventor(s): Muckenhirn; Dieter (Au, DE), Debon; Charles (Staufen, DE)

  Assignee(s): Hecht Contactlinsen GmbH (Au, DE)

  Patent Number: 5,430,504

  Date filed: July 31, 1992

  Abstract: A device for manufacturing bifocal contact lenses is provided. It comprises a rotating head stock provided with an eccentric head supporting a lense holder for holding a lense blank. The lense holder is displaceable with respect to said eccentric head in a radial direction perpendicular to the axis of rotation. A sled is provided for supporting a cutting tool. Said sled pivotable around an axis which coincides with said axis of rotation and in addition displaceable to change the radii.For avoiding a step which would result at the junction line dividing the distant vision segment and the near vision segment, a control is provided for adjusting the tool to a first radius R1 for cutting the distant vision segment and for adjusting said tool to a second radius R2 for cutting said near vision segment. After cutting the distant vision segment during a first operation, the near vision segment is cut during a second operation such that a continuous transition is achieved between both segments.

  Excerpt(s): The present invention relates to a device for manufacturing bifocal contact lenses.... When manufacturing contract lenses using a device according to the state of the art, the surfaces of the near vision segment and the distant vision segment are coinciding in the center. However, adjacent to said center, a step-like junction line will result which

is detrimental with respect to wearing comfort and appearance.... It is the object of the present invention to provide a device by which a bifocal contact lense having no step-like transition zone may be manufactured.

Web site: http://www.delphion.com/details?pn=US05430504__

- **Bis-amido polybiguanides and the use thereof to disinfect contact lenses and preserve pharmaceutical compositions**

  Inventor(s): Park; Joonsup (Arlington, TX), McQueen; Nathaniel D. (Arlington, TX)

  Assignee(s): Alcon Manufacturing, Ltd. (Fort Worth, TX)

  Patent Number: 6,316,669

  Date filed: September 19, 2000

  Abstract: Bis-amido polybiguanides and their use as antimicrobial agents in pharmaceutical compositions are disclosed. A method of synthesis of bis-amido polybiguanides is also disclosed. The bis-amido polybiguanides are useful in the preservation of pharmaceutical compositions, particularly ophthalmic and otic pharmaceutical compositions and compositions for treating contact lenses. The compounds are especially useful for disinfecting/cleaning contact lenses.

  Excerpt(s): The present invention is directed to new polymeric biguanides having potent antimicrobial activity and little, if any, toxicity relative to human tissues. The amidopolybiguanides disclosed herein have many industrial applications, but are especially useful as antimicrobial preservatives in pharmaceutical compositions. The invention is particularly directed to the use of these compounds in compositions and methods for disinfecting contact lenses, and to the preservation of various types of ophthalmic products.... Contact lenses are exposed to a broad spectrum of microbes during normal wear and become soiled relatively quickly. Routine cleaning and disinfecting of the lenses are therefore required. Although the frequency of cleaning and disinfecting may vary somewhat among different types of lenses and lens care regiments, daily cleaning and disinfecting is normally required. Failure to clean and disinfect the lens properly can lead to a multitude of problems ranging from mere discomfort when the lenses are being worn to serious ocular infections. Ocular infections caused by particularly virulent microbes, such as Pseudomonas aeruginosa, can lead to loss of the infected eye(s) if left untreated, or if allowed to reach an advanced stage before treatment is initiated. It is therefore extremely important that patients disinfect their contact lenses in accordance with the regimen prescribed by their optometrist or ophthalmologist.... Unfortunately, patients frequently fail to follow the prescribed regimens. Many patients find regimens to be difficult to understand and/or complicated, and as a result do not comply with one or more aspects of the regimen. Other patients may have a negative experience with the regimen, such as ocular discomfort attributable to the disinfecting agent, and as a result do not routinely disinfect their lenses or otherwise stray from the prescribed regimen. In either case, the risk of ocular infections is exacerbated.

  Web site: http://www.delphion.com/details?pn=US06316669__

- **Carbohydrate composition and method for cleaning and disinfecting contact lenses**

  Inventor(s): Groemminger; Suzanne F. (Rochester, NY), Panicucci; Rick (Rochester, NY)

  Assignee(s): Bausch & Lomb Incorporated (Rochester, NY)

  Patent Number: 6,172,017

  Date filed: September 3, 1996

  Abstract: A cleaning solution for contact lenses is described that includes a carbohydrate that is a mono- or disaccharide, its alcohols or partially hydrolyzed esters or mixtures thereof. Preferred carbohydrates are sorbitol, glucose, maltose, sucrose, dulcitol, dextran, dextrin, mannitol, maltitol, or mannose, preferably in an amount of 0.001 to 10% by weight of an aqueous solution for cleaning the contact lenses. A preferred composition for cleaning contact lenses comprises sorbitol in an amount of about 0.1 to 1% by weight in an aqueous solution. A method for cleaning contact lenses with said carbohydrate cleaning solution is described and may be combined, for simultaneously cleaning and disinfecting contact lenses, with a chemical, antimicrobial agent or thermal disinfecting regimen.

  Excerpt(s): The field of this invention is cleaning contact lenses using carbohydrate compositions. More particularly, the invention relates to compositions and methods that combine cleaning using certain carbohydrates with thermal or chemical disinfecting of contact lenses.... In the normal course of wearing contact lenses, tear film and debris consisting of proteinaceous, oily, sebaceous and related organic manner have a tendency to deposit and build up on lens surfaces. As part of a routine care regimen, contact lenses must be cleaned to remove these film deposits and debris. Without proper cleaning and removal of deposits, wettability and optical quality of the lenses are reduced causing discomfort for the wearer and reduced visual clarity, respectively.... Further, contact lenses, especially those made from hydrophilic materials, must be frequently disinfected to kill harmful microorganisms that collect or grow on lens surfaces. A number of methods for disinfecting contact lenses have been used, such as subjecting the lenses to high temperature, oxidative chemicals or various antimicrobial agents.

  Web site: http://www.delphion.com/details?pn=US06172017__

- **Case for use in disinfecting soft contact lenses**

  Inventor(s): Kutner; Barry S. (Wilton, CT), Latowicki; Daniel A. (Newtown, CT), Malech; Kenneth E. (Briarcliff Manor, NY)

  Assignee(s): Flexiclave, Inc. (Briarcliff, NY)

  Patent Number: 5,516,495

  Date filed: February 3, 1995

  Abstract: A case for use in disinfecting soft contact lenses including a pair of lens-receiving compartments formed by a first pair of substantially dome-shaped members mounted on a first cover member and a second pair of substantially dome-shaped members mounted on a second cover member. The dome-shaped members shield the interior of the lens-receiving compartments from microwave radiation when the case is used in a heat disinfecting process in which microwave radiation is utilized. The dome-shaped members of the first and second pairs are adapted to be brought into contiguous relationship to thereby form the pair of compartments.

Excerpt(s): This invention relates generally to a case for holding soft contact lenses and, more particularly, to a case for holding soft contact lenses during heat disinfection processes.... In caring for hydrophilic gel (soft) contact lenses, attention must be directed toward, among other things, maintaining lens hydration and protecting the lenses from pathogens. Exposure of soft contact lenses to heat or to the action of soaking solutions are the techniques used to provide the disinfection necessary to protect soft contact lenses from pathogens.... Disinfecting lenses by soaking in germicidal solutions is a two step process which includes soaking the lenses in the solution until the lens is disinfected, and then rinsing the lenses with a rinsing solution prior to insertion. Typically, lenses are stored in a germicidal solution, such as one that derives its germicidal activity from thimerosal or chlorhexidine, for at least four hours and then are rinsed in a saline solution. Such techniques are time consuming, require the user to keep different solutions on hand, and risk eye irritation should the disinfecting solution not be adequately rinsed from the lenses.

Web site: http://www.delphion.com/details?pn=US05516495__

- **Centrifugal casting of contact lenses**

  Inventor(s): Neefe; Charles W. (811 Scurry St., Box 429, Big Spring, TX 79720)

  Assignee(s): none reported

  Patent Number: 4,422,984

  Date filed: September 13, 1982

  Abstract: A method of casting contact lenses by forcing the liquid monomer into the optical molds under very high pressure, the pressure being provided by centrifugal force by revolving the lens mold around a center of rotation perpendicular to the optical axis of the lens and polymerizing the liquid monomer under pressure to form the lens.

  Excerpt(s): The art of spin casting contact lenses has been in use for nineteen years. The principal value of spin casting is its low cost and high production. The disadvantages are the lenses are not spherical and the aspheric surface is of a shape that increases spherical aberration. The exact shape is most difficult to describe due to its being formed by several forces including centrifugal force, surface tension, viscosity of the liquid and radius of the concave mold. The Panofocal concept described in U.S. Pat. No. 3,641,717 is widely used to reduce the effects of spherical aberration. The most frequent use of Panofocal lenses is to provide increased acuity for patients having astigmatism. The Panofocal aspheric surface is on the convex or the plus lens surface and of longer radius toward the lens edge and reduced spherical aberration, improving the visual acuity of the wearer up to two lines Snellen. The aspheric surface formed on the concave or minus surface of a spin cast lens is also longer toward the edge, however, when the soft lens is placed on the eye, it results in a shorter radius toward the edge on the convex plus surface and greatly increases the spherical aberration effect. This has three disadvantages: (1) The usable optical zone in the center of the lens is reduced requiring the lens to center well. (2) The reduction in visual acuity due to increased spherical aberration effect. (3) Visual acuity will fluxuate with lens movement.... A gravity method using no seals and a movable floating mold is disclosed in U.S. Pat. No. 3,380,718 issued Apr. 30, 1968. Only the pressure of gravity could be used and the mold must be movable to compensate for monomer shrinkage upon polymerization and two types of catalyst must be used.... A method has been developed whereby the advantages of high pressure casting may be employed to produce lenses with spherical surfaces and without the need for movable molds or sealed molding cavities.

Web site: http://www.delphion.com/details?pn=US04422984__

- **Chamber for hydrating contact lenses**

  Inventor(s): Kindt-Larsen; Ture (Holte, DK), Keene; Darren (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: RE36,302

  Date filed: November 16, 1995

  Abstract: Male and female members for contact lenses where either member is able to hold the contact lens as it moves from station to station during the hydration process. The female member fits together with the male member forming a chamber. Each of the members contains a line centrally located so that both surfaces of the contact lens are flushed during the hydration process, and drainage takes place radially on the outside of the mated male and female chamber members. These members may be produced on a frame with a plurality of members, usually eight to a frame, to allow ease of processing. Full automation is possible, and complete and positive lens control during and step of the process through the packaging step is achieved.

  Excerpt(s): This invention relates to new and improved chambers for the manufacture of soft contact lenses. More particularly, the invention pertains to chambers prepared from metal or plastic materials which can be effectively employed for the continuous or semi-continuous hydration of one or a plurality of essentially polymerized soft contact lenses.... The increase of the popularity of the soft contact lenses has led to many proposals for their manufacture. This is especially true because current contact lens manufacture employs a number of discrete processing steps. First, a monomer, of an appropriate material having good optical properties when polymerized, is placed into a female mold. A male member is then placed over the mold, much as described in U.S. Pat. No. 4,640,489. The monomer is then polymerized by exposing the mold to ultraviolet light or by heat.... After polymerization, the lens is removed from the mold and hydrated by immersion in a bath. Generally this bath is comprised of a buffered salt solution with a surfactant. After hydration, the lens is washed and placed in a saline solution. Thereafter, the finished lens is packaged and made available for consumer use.

  Web site: http://www.delphion.com/details?pn=US0RE36302__

- **Chemical treatment to improve oxygen permeability through and protein deposition on hydrophilic (soft) and rigid gas permeable (RGP) contact lenses**

  Inventor(s): Meadows; David (Mission Viejo, CA)

  Assignee(s): Allergan, Inc. (Irvine, CA)

  Patent Number: 5,310,571

  Date filed: September 1, 1992

  Abstract: A method for treating hydrophilic and rigid gas permeable contact lenses, as well as the manufacture of protein adhesion resistant and gas permeable enhanced lenses, is obtained through purging the hydrated contact lens, formed from polymer comprising hydrogen atoms, substantially all water and oxygen, and thereafter exposing the purged contact lens to a fluorine-containing gas in non-plasma conditions for a period of time and at a temperature sufficient to replace hydrogen atoms in the polymer

in order to inhibit protein deposits on the contact lens. The conditions of fluorine exposure can be controlled in order to provide a gas permeable enhanced contact lens.

Excerpt(s): Extended wear contact lenses such as hydrophilic (soft) and rigid gas permeable (RGP) contact lenses have been a major development in vision care. Conventional hydrophilic soft lenses are primarily hydrogels derived from a variety of hydrophilic monomers or polymers, which have either been cross-linked or insolubilized in water by some mechanism, such as by the introduction of crystallinity or by varying hydrophobic/hydrophilic properties.... Rigid gas permeable contact lenses have been prepared from many compounds, including siloxanyl alkyl methacrylates or fluoromethacrylates, usually in "polymerization" with other monomers to improve hardness, refractive index, and wettability. Typically, the rigid gas permeable contact lenses normally provide greater visual acuity than hydrogel lenses; however, such lenses do not have the inherent comfort of a soft hydrogel lens.... However, both hydrophilic soft and rigid gas permeable contact lenses develop extensive deposit formation on the lens surfaces by denatured proteins, mucopolysaccharides, lipids, phospholipids, cholesterol, insolubilized calcium salts, etc. In fact, extended wear lenses tend to have a greater build-up of proteins than traditional daily wear lenses, which have a lower water of hydration.

Web site: http://www.delphion.com/details?pn=US05310571__

- **Cleaning agents for contact lenses**

  Inventor(s): Sibley; Murray J. (Berkeley, CA), Yung; Gordon H. K. (Sunnyvale, CA), Urrea; Petronio D. (Pleasanton, CA)

  Assignee(s): Barnes-Hind Pharmaceuticals, Inc. (Sunnyvale, CA)

  Patent Number: 4,126,587

  Date filed: March 28, 1977

  Abstract: Method and compositions are provided for the effective cleaning of soft and silicone contact lenses by soaking the lenses for a time sufficient to remove adherent residues in a solution containing an epoxy modified silicone surfactant and a fatty acid amide (or nitrogen analog thereof) surfactant, which may be cationic or non-ionic. Other additives may also be included such as thickening agents, bactericides, salts, anionic surfactants, and the like. The compositions are found to be particularly effective in removing strongly adhering proteinaceous matter, as well as lipids and polysaccharides.By employing a particular combination of surfactants, soft contact lenses can be freed of impurities and adhering matter introduced during manufacture of the lens, while the lens is being hydrated. The lens is soaked under moderate conditions in an aqueous saline bath with a combination of a zwitterion surfactant and a fatty acid amide surfactant.

  Excerpt(s): Because of the polar nature of contact lenses, particularly soft contact lenses, and the environment in which soft contact lenses are handled and employed, a wide variety of materials adhere to the lenses during daily usage. During usage in the eye, the lenses are subjected to proteinaceous matter: particularly enzymes such as lysozyme; mucoproteins; and lipids, such as sterols, waxes, glycerides, phospholipids, fatty alcohols and acids. In addition to these naturally occurring materials, cosmetics, grease from the hands and dust and other materials in the air can all act together to form a strongly adhering coating to the lenses.... Soft lenses are highly porous and because of their fragile character cannot be mechanically scrubbed. In addition, the soft contact lens

acts as a host for bacteria and other disease causing organisms. Many of the common bactericides are adsorbed by the soft contact lens and act as an irritant in the eye, despite careful washing of the lens after treatment with the bactericide. Therefore, one sterilization treatment involves the use of steam. The high temperature has the effect of hardening the foreign coating on the lens, particularly by denaturing proteins which may be absorbed on the lens. An accumulation of a coating can result in distortion of the lens and reduction of light transmitted through the lens.... It is therefore desirable to find a simple and efficient way to ensure the removal of strongly adhering foreign matter from soft contact lenses, as well as other contact lenses. The method should be effective over a relatively short period of time, certainly not longer than over-night, and should be safe to the user and provide a clean lens which may be readily rinsed and then be safe to be introduced into the eye.

Web site: http://www.delphion.com/details?pn=US04126587__

- **Cleaning apparatus for contact lenses**

  Inventor(s): Lee; Chien H. (3 Fl., No. 3, Alley 16, Lane 591, Sec. 1, Nei Hu Road, Taipei, TW)

  Assignee(s): none reported

  Patent Number: 4,957,130

  Date filed: August 9, 1989

  Abstract: A cleaning apparatus for contact lenses including a housing, an enclosure in which a transmission means is installed, a knob and two containers. The transmission means has a main gear which is centrally disposed on a plate within an upper portion of the enclosure and loaded with a coil spring, a compound gear and a single gear. The main gear and the single gear are engageable with the compound gear. The main gear is activated by an upper gear of the compound gear and the single gear is activated by a bottom gear of the compound gear. A second spindle of the single gear is centrally disposed on the base of the enclosure and its lower portion is connected with an acceptor to which the containers are attached. The knob has a circumferential toothed portion on its inner circumference. The circumferential toothed portion is engageable with the upper gear.

  Excerpt(s): The present invention relates to a cleaning apparatus for contact lenses, and more particularly to such a cleaning apparatus for contact lenses which is rotatable by potential torque stored in a coil spring.... Although eye glasses are an essential tool which ensures the visually impaired clear sight, they are not always convenient or comfortable for daily wear. Consequently, contact lenses have become a popular alternative to eyeglasses, however, the cleaning procedure, important in order to keep eyes in healthy condition, is complicated.... In order to mitigate and/or obviate the above-mentioned drawbacks in the manner set forth in the detailed description of the preferred embodiment, the present invention is to provide a novel cleaning apparatus for contact lenses.

  Web site: http://www.delphion.com/details?pn=US04957130__

- **Cleaning composition for contact lenses**

  Inventor(s): Tsuzuki; Akira (Nagoya, JP), Kibe; Takeo (Nagoya, JP), Hioki; Shunichi (Ichinomiya, JP)

  Assignee(s): Toyo Contact Lens Co., Ltd. (Nagoya, JP)

  Patent Number: 4,440,662

  Date filed: September 13, 1982

  Abstract: A cleaning composition for contact lenses, comprises, as the major component, polypropyleneoxide-polyethyleneoxide block copolymers (Pluronic type) and/or condensation products of polypropyleneoxide-polyethyleneoxide block copolymers with ethylene diamine (Tetronic type), in which said major component is a mixture of those having an ethyleneoxide content of from 35 to 55% by weight and a molecular weight of from 1,500 to 10,000 and those having an ethyleneoxide content of from 70 to 90% by weight and a molecular weight of at least 4,000.

  Excerpt(s): The present invention relates to a cleaning composition for contact lenses. More particularly, it relates to a cleaning composition particularly useful for water-absorptive contact lenses.... Heretofore, various kinds of contact lenses have been used. As typical contact lenses, there are water-nonabsorptive contact lenses made of polymethyl methacrylate or silicone rubber and water-absorptive contact lenses made predominantly of poly-2-hydroxyethyl methacrylate or polyvinyl pyrrolidone.... When these contact lenses are worn on eyes, secretions in the eyes, such as proteins or sebum, tend to deposit on the surfaces of the lenses. Therefore, upon removal from the eyes, the contact lenses must be cleaned to remove the deposited proteins or sebum from the lens surfaces. If inadequately cleaned contact lenses are inserted into eyes, they are likely to cause uncomfortable symptons such as foggy sight, pain or ocular injection, and in an extreme case, it will be necessary to stop wearing the contact lenses.

  Web site: http://www.delphion.com/details?pn=US04440662__

- **Cleaning contact lenses with solution of bromelain and carboxypeptidase**

  Inventor(s): Anderson; Ronald L. (525 Sunbury Rd., Westerville, OH 43081), Mascio; Maria R. (525 Sunbury Rd., Westerville, OH 43081)

  Assignee(s): none reported

  Patent Number: 4,521,254

  Date filed: February 5, 1982

  Abstract: A method and composition for the effective cleaning and treatment of soft, high water content, contact lenses, particularly the non-aphakic lens approved for general extended use and the aphakic lenses approved for prescribed use as a method of visual correction for the aphake. The method comprises immersing the lens in an aqueous solution which includes the protease, bromelain, as a principal ingredient and a further minor portion of carboxypeptidase enzyme, as the cleansing and treatment agent. The combination of bromelain and carboxypeptidase enzymatic agents produces surprisingly better cleansing results, in substantially shorter time, than either agent alone. The solution removes protein, mucin, lipid, calcium, mineral, and other physiologically encountered debris from the lens; and the lens so treated shows enhanced resistance to the accumulation of further deposits when subsequently worn by the patient.

Excerpt(s): This invention relates to a cleansing solution and method for the removal of surface adhering and penetrating deposits of physiologically encountered debris which occur in the polymeric matrix of "soft" contact lenses. Such types of lenses are those which are worn for extended periods of time, and are known as "extended wear soft contact lenses"; however, the invention is as well applicable to daily wear soft contact lenses. Preferably, the invention is applicable to polymeric "soft" contact lenses having a normal water content greater than 38.6%.... The initial development of the hydrophilic gel that comprises today's flexible lens occurred in 1960 in Europe by Professor Otto Wichterle and Dr. Drahoslav Lim. The importance of the structural similarity of the gel material to living tissue in eliminating the incompatibility between foreign body and tissue was stressed. The use of this material for contact lenses followed. Hydrophilic lenses became commercially available in Europe during the 1960's.... The Bausch and Lomb lens, "Soflens" was the first type of such soft contact lens to be approved by the Food and Drug Administration in the United States. The lens was approved for cosmetic purposes and served as the guideline for other lens manufacturers. A list of lenses approved by the FDA appears in the February 1980 issue of Contact Lens Forum. Aphakic lenses, such as the "Permalens" manufactured by the Cooper Co., Mountain View, Calif., the "Hydrocurve II" lens manufactured by Hydrocurve, Inc., San Diego, Calif., and the "Sofaulon" lens manufactured by Hydro Schulte are such types of lenses which have been approved by the FDA for aphakic patients and for cosmetic use. Such types of "soft" contact lenses are generally formed of a cross linked polymeric material capable of forming a three-dimensional matrix which permits water absorption, thereby allowing the lens to be applied to the eye.

Web site: http://www.delphion.com/details?pn=US04521254__

- **Cleaning device for contact lenses**

  Inventor(s): Yoshihara; Mikio (Kariya, JP), Kai; Masasi (Toyota, JP), Oguma; Tomio (Anjo, JP), Aso; Yasuhiro (Kariya, JP)

  Assignee(s): Aisin Seiki Kabushiki Kaisha (Kariya, JP)

  Patent Number: 5,161,559

  Date filed: March 29, 1991

  Abstract: A cleaning device for contact lens which includes a housing having a cleaning chamber which is provided with a container chamber, a container disposed in the container chamber and forming a lens receiving chamber which receives contact lenses therein and a stirring device for generating a rising liquid flow which rises toward to the container chamber and is disposed at a lower side of the container. The container has plural passage holes which communicate between an inside of the lens receiving chamber and outside of the lens receiving chamber. At least one of the passage holes opens diagonally and downwardly as regard to the lens receiving chamber so as to introduce the rising liquid flow into the lens receiving chamber. Since the rising liquid flow flows diagonally from below into the lens receiving chambers via the passage holes, the contact lenses are gently floated in the lens receiving chamber so as to separate from the wall surface of the lens receiving chamber. Accordingly, it is possible to effectively clean the contact lenses without damaging the contact lenses.

  Excerpt(s): The present invention relates to a cleaning device for contact lenses.... In order to clean a contact lens, in general, the contact lens taken off of a naked eye is held by the palm of a hand or the tip of finger, and is cleaned by dropping a cleaning liquid on its surface, followed by rubbing the contact lens with the tip of the finger. Dirt

(particularly fat contained in tears) stained on the surface of a contact lens is thereby removed. After removal from the tip of the finger, the contact lens is rinsed with a rinsing liquid such as distilled water or the like. Thereafter, it is sterilized by boiling it in a preserving liquid such as a physiological saline solution or the like. After sterilizing, the contact lens is preserved in a preserving solution such as a physiological saline solution until the next morning.... Recently, as a cleaning device for contact lens, there have been developed an ultrasonic wave cleaner which cleans the contact lens with ultrasonic waves, and a cleaner which operates by a method of rubbing the surface of the contact lens in an elastic tray while manually holding the elastic tray.

Web site: http://www.delphion.com/details?pn=US05161559__

- **Cleaning hydrophilic contact lenses by electrochemical means**

Inventor(s): Heiler; David J. (Avon, NY), Marsh; David A. (Rochester, NY), Jonasse; Matthew S. (Sodus, NY), Panicucci; Rick (Rochester, NY)

Assignee(s): Bausch & Lomb Incorporated (Rochester, NY)

Patent Number: 5,451,303

Date filed: December 30, 1993

Abstract: A composition and method for cleaning and disinfecting of contact lenses that employ an electrical field applied to a lens that causes contaminating deposits to migrate therefrom is described. The composition of the invention includes a pair of component materials having different electrochemical potentials wherein the materials are substantially contained in a form wherein each material remains sufficiently physically separated when in contact with opposite sides of the lens such that the difference in electrochemical potential between the two materials is sufficient to cause charged contaminating deposits to migrate from the lens. The method of the invention requires placing a contaminated lens between a pair of component materials having different electrochemical potentials wherein physical separation is maintained, preferably, by including one of the components in a gel while the other component is in solution or another gel. Preferably, one component of the pair of materials is an oxidizing agent while the second component is a reducing agent. An example of a suitable pair is hydrogen peroxide suspended in a carbopol gel and a solution of sodium thiosulfate, as the reducing agent. A lens is coated with the oxidant gel, placed in the reductant solution and held at room temperature for 2-4 hours, wherein the electrochemical field established between the pair achieves about a 29% protein removal.

Excerpt(s): The field of the invention is cleaning of contact lenses by electrochemical or electrophoretic means. More particularly, contaminating deposits are removed from a contact lens by employing a small electrical current established through the lens that causes charged contaminating deposits, particularly protein contaminants, to migrate from the lens.... As is well known, contact lenses during wear become contaminated with deposits that adhere to the lenses over time. Proteins and lipids generated by the eyes' tear film, as well as microbial agents from the environment, adhere to the lenses such that they must be cleaned and disinfected frequently to preserve visual acuity and health of the wearer. Daily cleaners employing various surfactants are typically used to remove lipoid contaminants. The more difficult proteinaceous contaminants are removed by treating with enzyme. Disinfecting agents, such as hydrogen peroxide and other oxidants, are then utilized for disinfecting lenses, which agents often require reductants to neutralize residual oxidants before the lenses may be reinserted on the eye.... Typically, three separate regimens are involved in cleaning and disinfecting

contact lenses in accord with the processes described above. It is well known that lens wearers do not always properly comply with lens care regimens, particularly where the regimen involves a number of components and steps. Thus, contact lens manufacturers and those concerned with lens care are always looking to simplify or combine lens care regimens.

Web site: http://www.delphion.com/details?pn=US05451303__

- **Cleaning, conditioning, storing and wetting system and method for rigid gas permeable contact lenses and other contact lenses**

  Inventor(s): Sherman; Guy J. (St. Tammany, LA)

  Assignee(s): Sherman Laboratories, Inc. (Mandeville, LA)

  Patent Number: 5,141,665

  Date filed: July 11, 1990

  Abstract: A system and method for cleaning, conditioning, storing and wetting rigid gas permeable contact lenses is provided. The system includes a cleaning, conditioning and storing solution and a separate wetting solution. Both solutions contain hydrophilic disinfectants or preservatives which do not inhibit proper wetting of rigid gas permeable contact lenses. The lenses are stored in the cleaning, conditioning and storing solution during nonwearing periods. This storage also acts as a secondary or backup cleaning treatment to help remove any residual contaminants after the primary cleaning with this solution.In accordance with another embodiment of the invention, a preservative system is provided for a contact lens solution that comprises high purity benzyl alcohol.

  Excerpt(s): The present invention relates to a preservative system for contact lens solutions and to a rigid gas permeable contact lens cleaning, storing, conditioning and wetting system and method. More particularly, the present invention relates to a cleaning, storing, conditioning and wetting system and method for rigid gas permeable contact lenses that allows effective cleaning and conditioning and proper wetting of rigid gas permeable lenses.... Rigid gas permeable (RGP) lenses are manufactured from materials that exhibit a high degree of polarity, resulting in a strong interaction with proteins and other tear constituents that ultimately produce tenacious surface deposits. Current state of the art care systems combat this problem through the use of unpreserved abrasive cleaners that produce microscopic scratches which, in time, shorten the useful life of the lens. Some attempts have been made to competitively block surface deposition by so-called "conditioning" solutions, but this approach involves the use of cytotoxic preservatives and does not eliminate the need for the abrasive cleaner.... Proteolytic enzymes have been of marginal value in controlling surface deposition because their action is limited to proteinaceous material. Multifunctional esterases capable of lysing both proteins and lipids failed to significantly improve on the results obtained with their proteolytic counterparts and the consequences of their usage was a delayed, but persistent, surface deposition and premature loss of the lens.

  Web site: http://www.delphion.com/details?pn=US05141665__

- **Cleansing and sterilization mechanism suitable for contact lenses and the like**

  Inventor(s): Langford; Terrence R. (Tucson, AZ)

  Assignee(s): KEW Import/Export Inc. (Tucson, AZ)

  Patent Number: 5,184,633

  Date filed: October 8, 1991

  Abstract: A cleansing and sterilization mechanism which is usable on contact lenses, surgical instruments, dental tools, and other items which require regular cleansing and sterilization. Using ozone as the cleansing and sterilization medium, the apparatus provides for added guaranty of operation through the use of feedback mechanism to assure that all the components are working and that the to-be-cleaned items are exposed to the ozone bath for the specified time. Furthermore, the item is capable of communicating, via phone line, to a central unit which monitors the operation and performance of the mechanism.

  Excerpt(s): This invention relates generally to cleansing and sterilization of items and more particularly to the cleansing and sterilization of items through the use of ozone.... Although this invention has tremendous applications to a variety of items to be cleaned including but not limited to, dental tools, surgical instruments, implants, etc., for an understanding of the problems associated with cleansing and sterilization, the following discussion focusses on the cleansing and sterilization of contact lenses.... The success or tragic failure of contact lens wear is ultimately determined by the care and aseptic handling of the lenses. With over seventeen million contact lens wearers in the United States spending two billion dollars on contact lens supplies, a simple one step cleaning and sterilizing process is sought. Both hard and soft lenses currently need daily, or in the case of extended wear contacts, weekly cleaning and antiseptic treatment.

  Web site: http://www.delphion.com/details?pn=US05184633__

- **Color-imparting contact lenses with interference coating and method for making the same**

  Inventor(s): Li; Hongwen (Pittsford, NY), Ruscio; Dominic V. (Webster, NY), Salamone; Joseph C. (Boca Raton, FL)

  Assignee(s): Bausch & Lomb Incorporated (Rochester, NY)

  Patent Number: 6,164,777

  Date filed: December 16, 1998

  Abstract: Colored contact lenses that are colored by means of interference coatings for cosmetically enhancing or changing the color of the eyes are disclosed. In particular, the interference coating is applied to a surface of the lens material and, although transparent to the cornea and iris anatomy, so that the coating reflects pre-selected bands of the light spectrum to cosmetically change or enhance the natural color or hue of the eye.

  Excerpt(s): Colored contact lenses, which employ interference coatings to cosmetically change or enhance the color of the contact-lens wearer's eyes, are disclosed. In particular, the interference coating is applied to the surface of the lens material and, although transparent to the cornea and iris morphology, reflects pre-selected bands of the light spectrum to change the natural color or hue of the eye.... Contact lenses have been available in many colors, for many years, in both hard, including rigid gas permeable (RGP), and soft contact lenses. Both solid-colored lenses and tinted-colored

lenses have been disclosed. Such lenses may be colored by adding the colorants to the monomers used to make the lens, while the monomers are in the liquid state and before polymerization of the monomers to form the colored lens material. Solid-colored lenses typically employ pigments to color the portion of the lens covering the iris and the color masks the underlying iris pattern while the lens is worn. Of course, with such solid-colored lenses, it is usually necessary to have a transparent area over the optical zone in order for the contact-lens wearer to see at all.... Tinted contact lenses employ dyes to provide color without completely blocking the passage of light through the lens. For example, U.S. Pat. No. 4,447,474 to Neefe discloses a method of tinting specific areas of soft contact lenses by placing the dye in a dye carrier made of a porous material of the size and shape of the area to be tinted. The soft lens is placed on the dye carrier and absorbs the dye in a predetermined pattern. The acid dyes known as azo dyes may be used to practice the invention, as may the dyes known as reactive dyes and sulfur dyes. The sulfur dyes are fixed or made fast by removing the sodium sulfide that make the dye soluble. Reactive dyes require no special fixing step, only extraction of unreacted dye, as they react chemically with the lens material and are thus made permanent. The properties of dyes are well known in the art. Water-soluble dyes for tinting have been selected on the basis of their water solubility, previous FDA approval for human use, and their commercial availability as biological dyes. Care must be taken that the water-soluble dyes do not leach from the lens and stain the ocular tissue, especially during long-term contact with the eye.

Web site: http://www.delphion.com/details?pn=US06164777__

- **Comfortable, oxygen permeable contact lenses and the manufacture thereof**

  Inventor(s): Novicky; Nick N. (Calgary, CA)

  Assignee(s): Progressive Chemical Research, Ltd. (CA)

  Patent Number: 4,948,855

  Date filed: May 15, 1989

  Abstract: Comfortable, oxygen permeable hard and semi-hard contact lenses are made from the copolymer of ethylenically unsaturated siloxanylalkoxy ester monomer, ethylenically unsaturated fluorocarbon ester monomer and ethylenically unsaturated sulfone monomer; the copolymer plastic can be modified by the incorporation of hardening, stability and wettability agents and methods for the manufacture thereof.

  Excerpt(s): Oxygen permeable contact lenses in the prior art are essentially made from siloxane monomer and methyl methacrylate. These lenses are permeable to oxygen; hence, allowing oxygen from the air to pass through the lenses and reach the cornea which allows such lenses to be worn for longer periods of time as compared to non-oxygen permeable contact lenses such as PMMA which are available previously.... Such contact lenses were disclosed in the prior art by Gaylord, U.S. Pat. Nos. 3,808,178 and 4,120,570. Later, Ellis disclosed in his patents, U.S. Pat. Nos. 4,152,508 and 4,330,383, the partial replacement of the methyl methacrylate monomer with dimethyl itaconate. The Novicky patents, U.S. Pat. Nos. 4,216,303, 4,242,483, 4,248,989, 4,303,772 and 4,365,074, disclosed contact lenses comprised of high molecular weight of polysiloxanylalkyl esters of acrylic and methacrylic acids. The Chang patent, U.S. Pat. No. 4,182,822, disclosed contact lenses comprised of a copolymer from polysiloxanylalkyl ester of acrylic and methacrylic acid essentially the same as disclosed in the Gaylord patents, supra., that were copolymerized with N-vinyl pyrrolidinone or N,N-dimethyl methacrylamide.... In Ichinoche, et al., Canadian Pat. No. 1,184,341, it teaches the use of organosiloxanyl ester

monomer of acrylic and methacrylic acid copolymerized with fluorocarbon ester monomers of acrylic and methacrylic acids and copolymerized to produce oxygen permeable contact lenses. The LeBoeuf patent, U.S. Pat. No. 4,246,389, discloses acrylic siloxane based polymers which also contain HEMA and polyvinyl 2-pyrrolidinone which are suitable for use in forming water-containing oxygen permeable contact lenses.

Web site: http://www.delphion.com/details?pn=US04948855__

- **Compact heat disinfection unit for contact lenses**

  Inventor(s): Grambush; Douglas H. (Laguna Beach, CA), Holland; Gregory R. (Irvine, CA), York; Walter A. (El Toro, CA)

  Assignee(s): Allergan (Irvine, CA)

  Patent Number: 5,111,029

  Date filed: September 24, 1990

  Abstract: A compact heat disinfection unit for contact lenses including a waterproof unit having a chamber receiving therein a closed lens case. A heater is disposed in the unit for heating the case. The unit has a retractable blade assembly which folds back into the unit and is electrically coupled to the heater for actuating the same. A push button, accessible from the exterior of the unit, is provided for actuating the heater. The covers of the lens case cannot be removed while heating the same.

  Excerpt(s): The present invention generally relates to a compact heat disinfection unit for contact lenses and, more specifically, to a compact heat disinfection unit for contact lenses with additional safety features which utilizes low heat levels, a retractable blade assembly, and a separate dual compartment lens case to contain the solution and lenses.... In the past, the need to periodically clean and store contact lenses has been well known. This need was met by a variety of contact lens disinfection units. For example, Bowen, U.S. Pat. No. 4,578,566, discloses a contact lens disinfecting unit comprising a plastic housing, compartments for the lenses within the plastic housing, an electrically energized heating means, and electrical circuitry to connect the heating means to the energizing source. Subsequently, however, a need was felt for contact lens disinfection units which are suitable for portable use. Attempts to meet this need resulted in Braun, U.S. Pat. No. 4,701,597. Braun discloses a contact lens disinfection which comprises chambers for the lenses, a heating element, heat sinks coupled to the heating elements and the chambers, a thermostat, a thermostat heat sink, and a heat transfer element for transferring a controlled amount of heat from the heating element to the thermostat heat sink.... Despite the compact size of the lens disinfection units, problems with their use still existed. For example, the design of the units such as in Braun encouraged users to place the lens case on top of the unit and pour saline solution directly into the lens compartment while the unit was plugged into an electrical outlet. This created problems of saline solution spilling over from the lens case onto the unit and causing short-circuiting within the unit. In U.S. Pat. No. 4,873,424, another attempt to solve these prior art problems was disclosed. However, the Ryder device would allow a user to place a lens case on top of the unit to pour solution therein, allowing the same to possibly enter inside the unit. Also, there are no foldable contacts or hinged blades in Ryder allowing compact storing and travel. The Ryder unit requires one to plug it into the wall (which turns it on), then grasp the unit with wet hands (conventional cleaning of contacts involves washing of the lens in one's hands which results in wet hands) which might result in water and/or saline solution short-circuiting the device of the wall outlet.

Further, in Ryder, there is nothing holding or bracing the case B inside the unit and centering the same therein for uniform heating.

Web site: http://www.delphion.com/details?pn=US05111029__

- **Composite packaging arrangement for contact lenses**

  Inventor(s): Martin; Wallace Anthony (Orange Park, FL), Renkema; Kornelis (Jacksonville, FL), Lust; Victor (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: 5,685,420

  Date filed: March 31, 1995

  Abstract: A composite or secondary packaging arrangement for the containment of hydrophilic contact lenses in a sterile aqueous solution. More specifically disclosed is a composite or secondary packaging arrangement wherein pluralities of disposable hydrophilic contact lenses possessing different optical characteristics or prescriptions are contained in one or more specific packaging arrays which are then collectively housed in separate paired box-like compartments or carton structures in a preselected customized manner so as to provide specified or essentially measured supplies of differing contact lenses for prescribed use in both eyes of a consumer over a predetermined period of time.

  Excerpt(s): The present invention relates to a composite or secondary packaging arrangement for the containment of hydrophilic contact lenses in a sterile aqueous solution. More specifically, the invention pertains to a composite or secondary packaging arrangement wherein pluralities of disposable hydrophilic contact lenses possessing different medical characteristics or prescriptions are contained in one or more specific packaging arrays which are then collectively housed in separate paired box-like containers or carton structures in a preselected customized manner so as to provide specified or essentially measured supplies of differing contact lenses for use in both eyes of a consumer over a predetermined period of time.... The packaging of hydrophilic contact lenses in a sterile aqueous solution is well known in the contact lens manufacturing technology. In particular, such packaging arrangements generally consist of so-called blister packages which are employed for the storage and dispensing of the hydrophilic contact lenses by a medical practitioner or to a consumer who intends to wear the contact lenses. Generally, such hydrophilic contact lenses, which may be disposable after a single wear or short-term use, are manufactured from suitable hydrophilic polymeric materials. These materials may be, amongst others, copolymers of hydroxyethyl methacrylate containing from about 20% to 90% or more of water, depending upon the polymer composition. Generally, such contact lenses must be stored in a sterile aqueous solution, usually in isotonic saline solution in order to prevent dehydration and to maintain the lenses in a ready-to-wear condition.... Heretofore, contact lens manufacturers normally utilized stoppered glass bottles containing sterile saline solutions in which the hydrophilic contact lenses were immersed as storage and shipping containers for individual contact lenses. Each bottle was sealed with a suitable silicone stopper and provided with a metal closure as a safety seal in the configuration of an overcap. When the contact lens was intended to be removed from the bottle for use by a patient, the metal closure safety seal was required to be initially torn off the bottle, thereafter the stopper withdrawn and the lens lifted out from the bottle through the intermediary of a suitable plastic tweezer or pouring the contents out. This entailed the implementation of an extremely complicated procedure,

since the contact lens was difficult to grasp and remove from the saline solution contained in the bottle due to the transparent nature of the contact lens which rendered it practically invisible to the human eye.

Web site: http://www.delphion.com/details?pn=US05685420__

- **Composition and method treating soft contact lenses at elevated temperatures**

  Inventor(s): Sibley; Murray J. (Berkeley, CA), Yung; Gordon H. K. (Sunnyvale, CA), Urrea; Petronio D. (Sunol, CA)

  Assignee(s): Barnes-Hind Pharmaceuticals, Inc. (Sunnyvale, CA)

  Patent Number: 4,104,187

  Date filed: April 12, 1976

  Abstract: Method and compositions are provided for elevated temperature disinfection of soft contact lenses. The lenses are heated at a temperature and for a time sufficient to provide disinfection in an aqueous stabilized saline solution having a small amount of a non-eye-irritating neutral surfactant. Particularly effective are N-hydroxyalkylated fatty acid amides.

  Excerpt(s): A commonly used method for disinfection of soft contact lenses is to introduce the soft contact lens into a small holder containing a stabilized aqueous saline solution. The holder is introduced into a heater, where the holder and its contents are heated either by boiling water or a closed heated air environment. Temperatures of the solution in the holder generally range from about 70.degree.-90.degree. C and times for which the holder contents are maintained in this temperature range will generally vary from about 10-20 minutes. After cooling, the lenses may be removed from the holder, desirably rinsed and may then be introduced into the eye or left soaking, so as to remain hydrated over night.... While the disinfection method using an elevated temperature, frequently referred to as "boiling", is effective for disinfection, it has created a number of serious porblems for the soft contact lens wearer. Because of the chemical nature of the soft contact lens, a wide variety of materials will tenaciously adhere to the contact lens. Of particular importance are proteinaceous materials and lipid materials. The thermal treatment of the lens results in denaturation of the protein, which then forms a strongly adhering layer to the lens. Repetitive thermal disinfection of the contact lenses results in a continuous buildup of the proteinaceous layer, which also results in the binding of other materials, such as lipids, dust particles, and the like. As the proteinaceous layer builds up, the lens becomes irritating to the eye and with continued buildup loses its optical quality and clarity.... Any attempt to prevent the formation and buildup of a tenaciously adhering proteinacous layer during thermal disinfection is limited by a number of considerations. Among these considerations is the fact that the lens may be taken from the boiling solution and placed directly in the eye. Therefore, the solution must not introduce materials into the lens which will be irritating to the eye. Also, it is convenient that the boiling solution also be a rinse and soak solution, so that the lens after boiling may be rinsed with the same solution or be stored in the solution until used. Any additives introduced into the boiling solution must be stable and should not interact detrimentally with the contact lens. As a practical matter, the boiling solution must be stable and have a long shelf life, must be clear and must not adversely affect the optical characteristics and quality of the lens.

  Web site: http://www.delphion.com/details?pn=US04104187__

- **Composition for cleaning and wetting contact lenses**

  Inventor(s): Zhang; Hong J. (B2 Colonial Dr. #3, Andover, MA 01810), Ellis; Edward J. (9 Hampton Ct., Lynnfield, MA 01940), Wrobel; Stanley J. (8 Eastman Rd., Andover, MA 01810), Potini; Chimpiramma (29 Copley Dr., Methuen, MA 01844)

  Assignee(s): none reported

  Patent Number: 5,604,189

  Date filed: June 6, 1995

  Abstract: A composition for cleaning and wetting contact lenses comprises a polyethyleneoxide-containing material having a hydrophile-lipophile balance (HLB) of at least about 18, a surface active agent having cleaning activity for contact lens deposits, and a wetting agent.

  Excerpt(s): This invention relates to a composition for cleaning and wetting contact lenses which comprises a polyethyleneoxide-containing material having a hydrophile-lipophile balance (HLB) of at least about 18, a surface active agent having cleaning activity for contact lens deposits, and a wetting agent.... A care regimen for contact lenses involves various functions, such as regularly cleaning the lens with a contact lens solution containing a surface active agent as a primary cleaning agent. Rinsing of the contact lens is generally required following cleaning to remove loosened debris. Additionally, the regimen may include treatment to disinfect the lens, treatment to render the lens surface more wettable prior to insertion in the eye, or treatment to condition (e.g., lubricate or cushion) the lens surface so that the lens is more comfortable in the eye. As a further example, a contact lens wearer may need to rewet the lens during wear by administering directly in the eye a solution commonly referred to as rewetting drops.... Separate solutions may be provided for the individual savants of the care regimen. For convenience purposes, multipurpose contact lens solutions have gained popularity, i.e., solutions which can be used for several segments of the care regimen.

  Web site: http://www.delphion.com/details?pn=US05604189__

- **Composition for cleaning contact lenses**

  Inventor(s): Potini; Chimpiramma (Methuen, MA), Wrobel; Stanley J. (Andover, MA)

  Assignee(s): Wilmington Partners L.P. ()

  Patent Number: 5,607,908

  Date filed: March 16, 1995

  Abstract: A composition for cleaning contact lenses comprises a silicone surface active agent having cleaning activity for contact lens deposits. The silicone surface active agent has at least one side chain including a radical ionizable in aqueous solution.

  Excerpt(s): This invention relates to a composition for cleaning contact lenses which comprises a silicone surface active agent having cleaning activity for contact lens deposits.... The tendency of contact lens materials to form deposits necessitates regular cleaning of the contact lenses. Deposits from the tear film include protein, lipid and mucin, and deposits from external sources include cosmetic deposits, such as from mascara or hair spray, or materials deposited when the lens is handled.... Surfactant contact lens cleaners, which employ a surface active agent having cleaning action, are used to remove lipid deposits, loosely bound protein deposits, and other deposits.

Surfactant cleaners are used for hard and soft contact lenses. Hard lenses include polymethylmethacrylate lenses and rigid gas permeable (RGP) lenses formed of a silicon acrylate type or a fluorosilicon acrylate type polymer. Soft lenses include hydrophilic hydrogel lenses. Surfactant cleaners are generally used in conjunction with finger rubbing or other mechanical cleaning, followed by rinsing to remove the deposits.

Web site: http://www.delphion.com/details?pn=US05607908__

- **Composition for disinfecting contact lenses**

  Inventor(s): Le Rouzic; Daniel (Ermont, FR), Laforte; Eric J. (Paris, FR)

  Assignee(s): L'Air Liquide Societe Anonyme pour l'Etude et l'Exploitation des (Paris, FR)

  Patent Number: 4,743,447

  Date filed: April 23, 1987

  Abstract: A disinfecting solution for contact lenses, both hard lenses and flexible lenses, comprising an aqueous solution of hydrogen peroxide and peracetic acid.

  Excerpt(s): The present invention relates to a composition for disinfecting contact lenses.... The use of contact lenses involves a daily disinfecting treatment, and numerous and varied soaking and sterilization processes have been proposed.... Certain commercial compositions have as a base disinfecting agents, such as sodium mercurothiolate or chlorhexidine salts. According to U.S. Pat. No. 3,689,673, hydrophilic flexible contact lenses are treated by soaking in an aqueous containing from 0.001 to 0.1% chlorohexidine for a sufficient time and a sterilization is obtained in two to three hours with a solution of 0.001% concentration and in thirty minutes at a concentration of 0.01%.

  Web site: http://www.delphion.com/details?pn=US04743447__

- **Composition for rigid gas permeable contact lenses**

  Inventor(s): Chen; Richard Y. S. (Raleigh, NC)

  Assignee(s): Optical Research Inc. (Raleigh, NC)

  Patent Number: 5,162,469

  Date filed: August 5, 1991

  Abstract: A copolymer for making contact lenses comprises, by weight, from about 5 to about 85 percent of a polymerizable fluoromonomer, and from about 5 to about 75 percent of a polymerizable hydrolyzable silicone monomer. A polymerizable hydrophilic monomer can also be included. Additionally, an initiator and a crosslinker are usually preferably employed, but the initiator is not needed when polymerization is aided by radiation from a radioactive source such as cobalt-60.

  Excerpt(s): This invention relates to contact lenses, and in particular to rigid or hard contact lens having an exceptional combination of oxygen permeability, strength, and resistance to protein and mucus deposits.... There is a great need for a contact lens that has high oxygen permeability, wettability and resistance to protein and mucus deposits. These properties all contribute to an extension of the time during which a contact lens can be continuously worn by a wearer. High oxygen permeability is needed because the pupil of the eye has no blood circulation and extracts the oxygen needed by its cells

directly from the atmosphere. Wettability is essential for wearer comfort. Resistance to protein and mucus deposits from fluids that bathe the outer surface of the eye is essential since without this property the deposits will irritate the cornea and in some severe cases the deposits will scratch the cornea surface. Also as a result of the deposits, both visual acuity and the oxygen permeability of the lens can suffer.... Many types of contact lens compositions have been proposed. There are two general categories of contact lenses--rigid and hydrogel. For example, U.S. Pat. Nos. 3,808,178 and 4,120,570 to Gaylord; 4,139,692 to Tanaka et al; 4,686,276 to Ellis et al; 4,743,106 to Novicky et al and to Chen 4,812,598 propose the use of various copolymer compositions including silicon in contact lenses. U.S. Pat. No. 4,130,706 to Plambeck, Jr. proposes a methacrylate-type fluoropolymer ("FMA") for making contact lenses. While the lenses are described as hydrophilic and oxygen permeable, it is believed that they are not wettable enough to be truly comfortable to persons wearing the lenses and are not sufficiently permeable to oxygen to be worn safely and continuously for extended periods. U.S. Pat. No. 3,940,207 to Barkdoll proposes contact lenses constructed of fluorine-containing polymers that are soft and have a low refractive index. It is believed that these contact lenses are not sufficiently oxygen permeable to be worn safely for extended periods.

Web site: http://www.delphion.com/details?pn=US05162469__

- **Compositions and methods for disinfecting and cleaning contact lenses**

  Inventor(s): Park; John Y. (Santa Ana, CA), Thomas; Larry K. (Irvine, CA), Peng; Lin (Sunnyvale, CA), Cafaro; Daniel P. (Walnut Creek, CA)

  Assignee(s): Allergan (Waco, TX)

  Patent Number: 5,746,972

  Date filed: November 1, 1996

  Abstract: Compositions and methods for disinfecting and cleaning contact lenses include a liquid medium containing hydrogen peroxide and a defined ethylene oxide/propylene oxide block copolymer. An advantageously reduced amount of foaming occurs when the hydrogen peroxide is destroyed, particularly by the action of catalase.

  Excerpt(s): This invention relates to compositions and methods for disinfecting contact lenses. More particularly, the invention relates to compositions and methods adapted for disinfecting and cleaning a contact lens in a single step so that the treated lens can be placed in the eye of a human being for safe and comfortable wear.... Contact lenses should be periodically disinfected by the user to prevent infection or other deleterious effects on ocular health which may be associated with contact lens wear. Currently, there are several different conventional systems and methods which enable the user to disinfect his/her contact lenses between wearing times. These conventional cleaning and disinfection systems can be divided into "hot" and "cold" systems. Hot systems require the use of heat to disinfect the contact lenses, whereas cold systems use chemical disinfectants at ambient temperatures to disinfect the lenses.... Within the realm of cold disinfection systems are hydrogen peroxide disinfection systems. Disinfecting hydrogen peroxide solutions are effective to kill the bacteria and fungi which may contaminate contact lenses. However, residual hydrogen peroxide on a disinfected contact lens may cause irritation, burning or trauma to the eye unless this hydrogen peroxide is destroyed, i.e., decomposed, neutralized, inactivated or chemically reduced. Therefore, destruction of the residual hydrogen peroxide in the liquid medium containing the

disinfected contact lens is needed to enable safe and comfortable wear of the disinfected contact lens.

Web site: http://www.delphion.com/details?pn=US05746972__

- **Compositions and methods for disinfecting contact lenses and preserving contact lens care products**

  Inventor(s): Park; John Y. (Santa Ana, CA), Peng; Lin (Tustin, CA), Cafaro; Daniel P. (Santa Ana, CA), Dziabo; Anthony J. (Lake Forest, CA)

  Assignee(s): Allergan (Waco, TX)

  Patent Number: 6,024,954

  Date filed: August 2, 1996

  Abstract: Compositions for disinfecting contact lenses include a liquid medium containing a chlorite component, preferably a water soluble chlorite component, in a contact lens disinfecting amount, and a polyanionic component, preferably a water soluble polyanionic component, in an amount effective to do at least one of the following: inhibit formation of protein deposit material on a contact lens immersed in the composition; reduce the toxicity of the composition to the human eye, and reduce the damage to a contact lens caused by immersing the contact lens in the composition. The composition has a viscosity of less than 50 cps at 25.degree. C., an osmolality of at least about 200 mOsmol/kg, and preferably a pH in the range of about 6 to about 9.

  Excerpt(s): This invention relates to compositions and methods useful in disinfecting contact lenses and in preserving contact lens care products. More particularly, the invention relates to compositions and methods in which contact lenses are disinfected and/or contact lens care products are preserved using compositions containing chlorite components and polyanionic components.... The use of chlorine dioxide dissolved in an aqueous liquid medium to disinfect contact lenses has previously been suggested.... Park et al U.S. Pat. No. 5,336,434 and Dziabo et al U.S. Pat. No. 5,338,480 disclose contact lens disinfecting using chlorine dioxide in which delayed release components are used to delay the release of chlorine dioxide activators, chlorine dioxide destroying components and/or cleaning enzyme components. Various delayed release components are disclosed, for example, soluble cellulose ethers such as methylcellulose, methylhydroxypropylcellulose, methylhydroxyethylcellulose, hydroxypropylcellulose, hydroxyethylcellulose and sodium carboxymethylcelluloses; cellulose esters such as cellulose acetate phthalate and hydroxypropylmethyl-cellulose phthalate; polymers derived from at least one of acrylic acid, acrylic acid esters, methacrylic acid and methacrylic acid esters such as methacrylic acid-methyl methacrylate copolymer (for example, that sold by Rohm Pharma under the trademark Eudragit L 100) and methacrylic acid-ethyl acrylate copolymers (for example, that sold by Rohm Pharma under the trademark Eudragit L 30D); polymers derived from methyl vinyl ether and maleic acid anhydride; polyvinylpyrrolidone; polyvinyl alcohols and the like and mixtures thereof. However, neither of these patents discloses that such delayed release components are effective to delay or prevent proteinaceous deposit formation on the contact lens being disinfected or to reduce the toxicity of the disinfecting composition to the human eye.

  Web site: http://www.delphion.com/details?pn=US06024954__

- **Compositions and methods for disinfecting contact lenses and reducing proteinaceous deposit formation**

  Inventor(s): Park; John Y. (Santa Ana, CA), Peng; Lin (Tustin, CA), Dziabo; Anthony J. (Lake Forest, CA)

  Assignee(s): Allergan (Waco, TX)

  Patent Number: 5,648,074

  Date filed: December 12, 1994

  Abstract: Compositions and methods for disinfecting contact lenses are disclosed. In one embodiment, the present compositions include a liquid medium containing chlorine dioxide precursor in an amount effective to form, when activated, a chlorine dioxide-containing composition including a contact lens disinfecting amount of chlorine dioxide. A polyanionic component, preferably a water soluble polyanionic component, is included in the composition in an amount effective to inhibit the formation of proteinaceous deposit material on a contact lens immersed in the chlorine dioxide-containing composition. Thus, effective contact lens disinfection is achieved while, at the same time, reducing the risk of forming proteinaceous deposit material on the contact lens during the disinfecting processing.

  Excerpt(s): This invention relates to compositions and methods useful in disinfecting contact lenses. More particularly, the invention relates to compositions and methods in which contact lenses are disinfected using a composition containing chlorine dioxide and a polyanionic component effective to inhibit the formation of proteinaceous deposit material on the contact lens being disinfected.... The use of chlorine dioxide dissolved in an aqueous liquid medium to disinfect contact lenses has previously been suggested. Although chlorine dioxide is very effective in disinfecting contact lenses, the tendency of the chlorine dioxide to combine with proteins, for example, lysozyme, present on or in the contact lens has caused some concern. The combination of such contact lens associated proteins and chlorine dioxide may result in the formation of proteinaceous deposits on the lenses, which may have some effect on the wearability of such lenses.... Park et al U.S. Pat. No. 5,336,434 and Dziabo et al U.S. Pat. No. 5,338,480 disclose contact lens disinfecting using chlorine dioxide in which delayed release components are used to delay the release of chlorine dioxide activators, chlorine dioxide destroying components and/or cleaning enzyme components. Various delayed release components are disclosed, for example, soluble cellulose ethers such as methylcellulose, methylhydroxpropylcellulose, methylhydroxyethylcellulose, hydroxypropylcellulose, hydroxyethylcellulose and sodium carboxymethylcelluloses; cellulose esters such as cellulose acetate phthalate and hydroxypropylmethyl-cellulose phthalate; polymers derived from at least one of acrylic acid, acrylic acid esters, methacrylic acid and methacrylic acid esters such as methacrylic acid-methyl methacrylate copolymer (for example, that sold by Rohm Pharma under the trademark Eudragit L 100) and methacrylic acid-ethyl acrylate copolymers (for example, that sold by Rohm Pharma under the trademark Eudragit L 30D); polymers derived from methyl vinyl ether and maleic acid anhydride; polyvinylpyrrolidone; polyvinyl alcohols and the like and mixtures thereof. However, neither of these patents discloses that such delayed release components are effective to delay or prevent proteinaceous deposit formation on the contact lens being disinfected.

  Web site: http://www.delphion.com/details?pn=US05648074__

- **Compositions and methods for inhibiting and reducing lysozyme deposition on hydrophilic contact lenses using biocompatible colored compounds**

  Inventor(s): Vehige; Joseph G. (28386 La Pradera, Laguna Niguel, CA 92677)

  Assignee(s): none reported

  Patent Number: 5,451,237

  Date filed: November 10, 1993

  Abstract: Disclosed are compositions and methods for inhibiting the uptake of proteins and reducing the formation of lysozyme deposits on the outer surface and inner bulk matrix of hydrophilic contact lenses. The method comprises contacting a contact lens with a positively charged chemical which imparts a tint to the lens.

  Excerpt(s): This invention relates generally to cleaning contact lenses. More particularly, the present invention relates to compositions and methods useful for inhibiting the uptake of proteins and reducing the formation of protein deposits on the outer surface and/or in the inner bulk matrix of hydrophilic contact lenses using biocompatible colored compounds.... During handling and wear, contact lenses are susceptible to the accumulation of a variety of materials which may adhere to the surface of the lens and/or lodge within and adhere chemically and/or spatially to the inner bulk matrix of the lens. For example, during wear, lenses contact proteinaceous materials such as lysozyme and mucoproteins, both of which are constituents of lachrymal tears, and lipids such as sterols, waxes, glycerides, phospholipids, fatty alcohols and acids.... If contact lenses are not properly cleaned, lysozyme, mucoproteins and other soils can accumulate on and/or in the lens to a point where the lens wearer begins to feel discomfort, for example due to altered lens fit, the lens spectral characteristics are adversely affected, for example through discoloration due to the deposits, disinfection may be impeded, and the gas permeability may be decreased. Such soiling decreases the overall estimated useful lifetime of the lens.

  Web site: http://www.delphion.com/details?pn=US05451237__

- **Compositions and methods for storing contact lenses**

  Inventor(s): Park; John Y. (Tustin, CA), Cafaro; Daniel (Walnut Creek, CA), Dziabo; Anthony J. (Lake Forest, CA)

  Assignee(s): Allergan (Waco, TX)

  Patent Number: 5,882,687

  Date filed: January 10, 1997

  Abstract: Compositions for storing contact lenses include a liquid medium containing a polyanionic component, preferably a water soluble polyanionic component, in an amount effective to provide a hydration layer on the surface of said contact lens. The composition has a viscosity of less than 50 cps at 25.degree. C., an osmolality of at least about 200 mOsm/kg, and preferably a pH in the range of about 6 to about 9.

  Excerpt(s): This invention relates to compositions and methods useful in contact lenses. More particularly, the invention relates to compositions and methods in which contact lenses are stored. The present invention provides compositions containing polyanionic components.... The current commercial process for packaging contact lenses is to place a single contact lens in a glass vial, fill the vial with saline solution, cap and seal the vial and then heat sterilize of the lens. This process is also used for daily-disposable lenses.

Indeed, this packaging process results in one of the meritorious attributes with the use of daily-disposable lenses: comfort associated with wearing fresh lenses every day. However, symptoms of discomfort, fatigue, and irritation at the end of the day are common among daily-disposable lens wearers. To alleviate or reduce the aforementioned symptoms, incorporation of a comfort enhancing agent(s) and/or a lubricant(s) into the lens storage medium is highly desirable, which also can make the extension of the lens wearing time possible. This is critical to the consumer of a daily-disposable lens.... Since the current packaging process requires heat sterilization, commonly used lubricants like polyvinyl alcohol (PVA), polyethylene glycol (PEG), hydroxypropyl methylcellulose (HPMC) are not suitable for this purpose due to their physio-chemical instabilities. A suitable lubricant should have a high affinity toward water and contact lens surface so that a hydration layer can be formed on the lens surface. For example, upon heating, HPMC in aqueous solution loses water from the hydration. As a result, it loses lubricity on the lens surface.

Web site: http://www.delphion.com/details?pn=US05882687__

- **Compositions and methods to clean contact lenses**

  Inventor(s): Dziabo; Anthony J. (El Toro, CA), Karageozian; Hampar (Laguna Hills, CA), Ripley; Paul S. (Irvine, CA), Lam; Sam W. (Laguna Niguel, CA), Espiritu; J. Abraham (Oceanside, CA)

  Assignee(s): Allegan, Inc. (Irvine, CA)

  Patent Number: 5,338,480

  Date filed: March 4, 1991

  Abstract: Compositions and methods to clean contact lenses are disclosed. In one embodiment, the present composition comprises at least at least one enzyme capable of removing debris from a contact lens and at least one disinfectant destroying component capable of destroying a contact lens disinfectant which is incompatible with the at least one enzyme. The composition is structured so that the at least one enzyme is released in a liquid medium containing the contact lens disinfectant at substantially the same time or after the at least one disinfectant destroying component is released in the liquid medium, thereby allowing the at least one enzyme to remove debris from a contact lens in the liquid medium.

  Excerpt(s): This invention relates to cleaning lenses, such as contact lenses. In particular, the invention relates to compositions and methods useful to quickly and effectively enzymatically clean contact lenses.... Contact lenses should be periodically disinfected and cleaned to protect the wearer's eyes from infection and to improve the wearer's comfort. It is often desirable that lens disinfecting be accomplished quickly, e.g., for the convenience of the wearer. However, conventional fast-acting disinfectants that are used with contact lenses have a high potential to cause eye irritation. A disinfectant which can be easily and effectively dissipated after use would be advantageous to reduce the chance of eye irritation.... In addition to being disinfected, the contact lens should be cleaned, e.g., of protein-based debris which accumulates on the lens during use. Such lens cleaning is often done in the presence of one or more enzymes. See, for example, Karageozian U.S. Pat. No. 3,910,296. In many instances, a complete lens maintenance procedure involves first enzymatic cleaning followed by a separate lens disinfecting step. It would be advantageous to provide for disinfecting and cleaning contact lenses in a one-step procedure.

Web site: http://www.delphion.com/details?pn=US05338480__

- **Compositions and methods to disinfect contact lenses**

  Inventor(s): Thomas; Larry K. (Fullerton, CA)

  Assignee(s): Allergan (Waco, TX)

  Patent Number: 6,338,847

  Date filed: February 28, 1994

  Abstract: Compositions and methods to disinfect contact lenses are disclosed. In one embodiment, the present composition comprises a cellulose decomposing enzyme component, e.g., lysozyme, and a hydrogen peroxide destroying component. The composition is structured so that the cellulose decomposing enzyme component is released in a liquid medium containing hydrogen peroxide before the hydrogen peroxide destroying component is released in the liquid medium. Such cellulose decomposing enzyme component is preferably effective to render hydrogen peroxide-resistant microorganisms, e.g., acanthamoeba cysts, which may contaminate the lens more susceptible to being killed by hydrogen peroxide.

  Excerpt(s): This invention relates to compositions and methods to disinfect contact lenses. More particularly, the invention relates to such compositions and methods which are useful to facilitate the action of hydrogen peroxide in disinfecting contact lenses and in destroying residual hydrogen peroxide present in a liquid aqueous medium containing a contact lens which has been disinfected by the action of hydrogen peroxide.... Contact lenses should be periodically cleaned and disinfected by the user to prevent infection or other deleterious effects on ocular health which may be associated with contact lens wear. Currently, there are several different conventional systems and methods which enable the user to clean and disinfect their contact lenses between wearing times. These conventional cleaning and disinfection systems can be divided into "hot" and "cold" systems. Hot systems require the use of heat to disinfect the contact lenses, whereas cold systems use chemical disinfectants at ambient temperatures to disinfect the lenses.... Within the realm of cold disinfection systems are hydrogen peroxide disinfection systems. Disinfecting hydrogen peroxide solutions are effective to kill many of the bacteria, fungi and yeasts which may contaminate contact lenses. However, certain microorganisms are resistant to the action of hydrogen peroxide.

  Web site: http://www.delphion.com/details?pn=US06338847__

- **Compositions comprising polyquaterniums in combination with polymeric biguanides for disinfecting contact lenses**

  Inventor(s): McCanna; David J. (211 Greystone La. Apt. 20, Rochester, NY 14618), Maier; Stephen E. (47 Frazier St., Brockport, NY 14420), Heiler; David J. (173 Wadsworth Ave., Avon, NY 14414), Spooner; Susan P. (22 Saybrooke Dr., Penfield, NY 14526), Xia; Erning (93 Chippenham Dr., Penfield, NY 14526)

  Assignee(s): none reported

  Patent Number: 6,153,568

  Date filed: November 12, 1998

Abstract: The present invention is directed to an ophthalmically safe disinfecting solution for contact lenses comprising the combination of a polymeric biguanide and a polyquaternium polymer of a substituted or unsubstituted vinylimidazole or its vinylimidazoliuum salt, which copolymer has a weight average molecular weight of 5,000 to 5,000,000. The invention is also directed to an improved method of disinfecting a contact lens.

Excerpt(s): This invention relates to new and improved solutions for the treatment of contact lenses and to methods for treating contact lenses with such solutions. In particular, the present invention is directed to disinfecting solutions comprising the combination of a biguanide polymer and a polyquaternium copolymer of substituted or unsubstituted vinylimidazole or its vinylimidazoliuum salt.... Generally, contact lenses in wide use fall into three categories: (1) hard lenses formed from materials prepared by polymerization of acrylic esters, such as polymethyl methacrylate (PMMA), (2) rigid gas permeable (RGP) lenses formed from silicone acrylates and fluorosilicone methacrylates, and (3) gel, hydrogel or soft type lenses made of polymerized hydrophilic or hydrophobic monomers, such as 2-hydroxyethyl methacrylate (HEMA). The hard acrylic type contact lenses are characterized by low water vapor diffusion constants, resistance to the effects of light, oxygen and hydrolysis, and absorb only minor amounts of aqueous fluids. Because of the durability of hard contact lenses, coupled with their tendency not to absorb appreciable amounts of water, the selection of suitable disinfecting agents, cleaning agents or other lens care compounds is relatively non-critical.... However, unlike hard lenses, soft-type contact lenses have a tendency to bind and concentrate significantly more fluids, environmental pollutants, water impurities, as well as antimicrobial agents and other active ingredients commonly found in lens-care solutions. In most instances, the low levels of the ingredients in lens-care solutions do not lead to eye tissue irritation when used properly. Nevertheless, especially due to the inherent binding action of protein deposits to soft-lens materials, some disinfecting agents and preservatives tend to build up on lens surfaces and may become concentrated to potentially hazardous levels, such that when released could cause corneal inflammation and other eye tissue irritation.

Web site: http://www.delphion.com/details?pn=US06153568__

- **Compositions comprising water and hydrophilic polymers and contact lenses therefrom**

Inventor(s): Kuzma; Petr (1708 Westminster Blvd., Parlin, NJ 08859)

Assignee(s): none reported

Patent Number: 4,328,148

Date filed: December 15, 1980

Abstract: There is a prepared a hydrophilic water swellable, water insoluble copolymer of (1) at least 35% of a hydroxy (C.sub.2 -C.sub.4 -alkyl)-2-alkenoate, (2) 30 to 60% of a 2-alkenamide or an N, N-di (C.sub.1 -C.sub.6 -alkyl)2-alkenamide, (3) 5 to 20% of R --OR.sub.1 --.sub.x Z where R is C.sub.1 -C.sub.6 alkyl, R.sub.1 is C.sub.2 -C.sub.4 alkylene, x is an integer of 1 to 4 and Z is 2-alkenoyloxy and (4) 0.3 to 5% of a polyethylenically unsaturated crosslinking agent having a relatively long aliphatic chain, the copolymer being capable of holding 50 to 80 weight % of water. The polymers are particularly useful in preparing hydrophilic contact lenses of high burst strength and extended wear properties.

Excerpt(s): The present invention relates to novel hydrophilic copolymers and soft contact lenses made therefrom.... A hydrophilic polymer suitable for use as an extended wear soft contact lens must have high oxygen permeability and good mechanical strength.... Tolerance of a soft lens by the ocular environment is affected by water content, shape, or geometry, thickness and edge quality. The surface of the lens should be smooth in order not to affect the normal precorneal tear film and the superficial epithelial layer. Such a smooth surface should not be affected by temperature, pH, tonicity and foreign body deposition, mucous adhesion, lipids of the tears or abrasion by the lids. Wettability of the lens surface is important in order to allow tears to fill the lens-corneal interspace. The lens should also be physiologically inert.

Web site: http://www.delphion.com/details?pn=US04328148__

- **Contact lenses**

  Inventor(s): Lorenz; Kathrine Osborn (N. Jacksonville Beach, FL), Clutterbuck; Timothy A. (Jacksonville, FL), Armitage; Brian S. (Jacksonville Beach, FL), Orr; Susan B. (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Care, Inc. (Jacksonville, FL)

  Patent Number: 6,454,409

  Date filed: August 15, 2000

  Abstract: Contact lenses that have a back edge designed so that the flat portion of the edge does not rest on the wearer's conjunctiva are provided. The lenses of the invention exhibit good lens handling as well as excellent on-eye comfort and movement.

  Excerpt(s): The invention relates to contact lenses. In particular, the invention relates to contact lenses that have a back edge designed so that the flat portion of the edge does not rest on the wearer's conjunctiva. The lenses of the invention exhibit good lens handling as well as excellent on-eye comfort and movement.... The use of contact lenses for cosmetic effect and the correction of visual acuity is well known. One disadvantage of contact lenses is that they are subject to debris accumulation while in use. Debris removal, in part, is facilitated if the lens moves easily on the eye because such movement allows tear fluid to remove debris from under the lens. However, the design of the back surface edges of most conventional contact lenses is flat, hindering movement of the lens on the eye. Additionally, the back surface edge of these conventional lenses may form a sharp edge that impinges on the conjuctival membrane, indenting and roughening the membrane.... Although the edge-off-eye design represents an improvement compared to conventional lens designs, problems with conjunctival indentations, and less than desirable on-eye movement can occur with edge-off-eye lenses. Thus, a need exists for an improved edge-off-eye lens.

  Web site: http://www.delphion.com/details?pn=US06454409__

- **Contact lenses and method of fitting contact lenses**

  Inventor(s): Roffman; Jeffrey H. (Jacksonville, FL), Menezes; Edgar V. (Jacksonville, FL), Lewis; Yulin X. (Ponte Vedra Beach, FL), Poling; Timothy R. (Jacksonville, FL), Guillon; Michel (London, GB2)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: 5,835,192

  Date filed: December 21, 1995

  Abstract: A design family of contact lenses includes a central area utilized for distance vision, surrounded by multiple alternating annuli of near and distance optical powers, surrounded by a peripheral distance zone. The design can also be used in intraocular lenses (IOL). The distance optical power is constant across the design family of lenses, but the near optical power increases as a subject's presbyopia increases. The design family of contact lenses can be fitted to a patient in a standard fashion by fitting both eyes to the best distance visual acuity (VA), and obtaining near acuity from the near annuli. A modified monovision method fits the patient's dominant eye with a contact lens as described having the full prescription distance power and fitting the nondominant eye with a contact lens as described having a distance optical power between the full prescription distance optical power and the near optical power. Specifically, the nondominant eye is fitted with a contact lens as described but having a distance power between 50% and 100% of the range between the prescription near and distance optical powers, biased towards the distance optical power.

  Excerpt(s): The present invention pertains to ophthalmic lenses, and in particular to contact lenses containing more than one optical power or focal length.... In greater detail, the present invention relates generally to a method for fitting concentric annular ring contact lenses to a presbyopic patient.... It is well known that as an individual ages, the eye is less able to accommodate, i.e. bend the natural lens in the eye in order to focus on objects which are relatively near to the observer. This condition is referred to as presbyopia, and presbyopes have in the past relied upon spectacles or other lenses having a number of different regions with different optical powers to which the wearer can shift his vision in order to find the appropriate optical power for the object or objects upon which the observer wishes to focus.

  Web site: http://www.delphion.com/details?pn=US05835192__

- **Contact lenses based on biocompatible polyurethane and polyurea-urethane hydrated polymers**

  Inventor(s): Braatz; James A. (Rockville, MD), Kehr; Clifton L. (Silver Spring, MD)

  Assignee(s): W. R. Grace & Co.-Conn. (New York, NY)

  Patent Number: 4,886,866

  Date filed: February 16, 1989

  Abstract: Hydrophilic polymeric soft contact lenses which are characterized by their biocompatibility and resistance to nonspecific protein adsorption. At least 75%, preferably at least 80%, of the prepolymers from which the lenses are prepared are isocyanate-capped oxyethylene-based diols or polyols having molecular weight of about 7000-30,000. Essentially all of the hydroxyl groups of the diols or polyols are capped

with polyisocyanate prior to formation of the hydrated polymer of which the contact lenses are made.

Excerpt(s): This invention relates to the preparation of soft contact lenses for optical correction, based on synthetic hydrated polymers. More specifically, a unique series of crosslinked polyurethane and polyurea-urethane polymer gels is found to be particularly suitable for this purpose. These polymers are formed from high molecular weight isocyanate end-capped prepolymers which are substantially comprised of ethylene oxide units. These hydrophilic polymers are characterized by their biocompatibility and by their exhibiting a unique surface which resists nonspecific protein adsorption.... Numerous polyurethane polymers have been previously identified. Quite a few hydrogel polymers, prepared from various prepolymers, have been prepared and used for widely varying applications. Typically, hydrogels are formed by polymerizing a hydrophilic monomer in an aqueous solution under conditions such that the prepolymer becomes crosslinked, forming a three-dimensional polymeric network which gels the solution. Polyurethane hydrogels are formed by polymerization of isocyanate-end capped prepolymers to create urea and urethane linkages.... Polymer-based soft contact lenses are not new. U.S. 4,259,467 (Keogh et al.) discloses hydrophilic contact lenses prepared from the polymerization of polysiloxane monomers. U.S. 4,113,685 (Holcombe, Jr.) discloses hydrophilic contact lenses prepared from a copolymer of 2-hydroxyethyl methacrylate, isobutyl methacrylate, trimethylolpropane, trimethylacrylate, methacrylic acid, 2,5-dimethyl-2,5-bis-(2-ethyl hexoylperoxy)hexane.

Web site: http://www.delphion.com/details?pn=US04886866__

- **Contact lenses formed of mixtures of cellulose esters and ethylene/vinyl acetate copolymers**

  Inventor(s): Wingler; Frank (Leverkusen, DE), Eicher; Theobald (Dormagen, DE), Muller; Friedemann (Neuss, DE), Fischer; Winfried (Cologne, DE), Prinz; Richard (Leverkusen, DE)

  Assignee(s): Bayer Aktiengesellschaft (DE)

  Patent Number: 4,193,897

  Date filed: February 21, 1979

  Abstract: Contact lenses and scleral lenses formed of mixtures consisting essentially of(1) from 99 to 70% by weight of a cellulose ester of one or more aliphatic carboxylic acids, and(2) from 1 to 30% by weight of an ethylene/vinyl acetate copolymer containing from 30 to 98% by weight of incorporated vinyl acetate.

  Excerpt(s): This invention relates to contact lenses and scleral lenses formed of certain mixtures of cellulose esters and ethylene/vinyl acetate copolymers and to the use of these mixtures for the production of refractive materials for optical contact lenses.... A number of different polymers are already being used for contact lenses. The materials are in direct contact with the cornea and, for this reason, have a considerable influence upon the metabolic processes and upon the oxygen balance. The materials may produce irritation by the direct contact thereof with the eye.... Contact lenses are generally divided into two main types, namely hard lenses and soft, hydrophilic lenses. Lenses of the first type have been known for several years and are normally produced from polymethyl methacrylate which may be cut and polished to give lenses having good optical properties. However, hard polymethyl methacrylate lenses are attended by the

known disadvantage that they may irritate the cornea and the inside of the eyelid. If, therefore, a patient is to wear hard lenses, a considerable period of acclimatisation is required during which the patient wears the lenses for gradually increasing periods up to a maximum of about eight hours' continuous wearing. On account of this disadvantage, hard lenses are worn by only a small number of patients.

Web site: http://www.delphion.com/details?pn=US04193897__

- **Contact lenses from highly permeable siloxane polyol material**

  Inventor(s): Nunez; Ivan M. (1844 Grassington Way N., Jacksonville, FL 32223), Molock; Frank F. (1543 Wildfern Dr., Orange Park, FL 32073), Elliott; Laura D. (9480 Princeton Sq. Blvd. #1210, Jacksonville, FL 32256), Neil; Michele L. (340 Lolly La., Jacksonville, FL 32259), Ford; James D. (515 Nassau Ct., Orange Park, FL 32073)

  Assignee(s): none reported

  Patent Number: 5,648,402

  Date filed: June 1, 1995

  Abstract: The present invention provides soft contact lenses adopted for placement over the cornea or in the eye which have a high oxygen permeability, a low water content and excellent mechanical properties. Moreover, the lenses of the instant invention have excellent protein and lipid deposition resistance relative to conventional contact lenses. Such lenses having the properties mentioned above comprises a prepolymer which contains an alkoxylate glucoside that is derivatized with at least one polysiloxane compound. The prepolymer is then placed in a suitable mold and polymerized by exposure to ultraviolet light.

  Excerpt(s): The present invention relates to soft ophthalmic contact lenses and to methods for preparing the same. More specifically, the soft ophthalmic contact lenses of the instant invention are made from a prepolymer which comprises an alkoxylated glucoside that is derivatized with at least one polysiloxane compound. The prepolymer is then placed in an appropriate mold and polymerized by exposure to suitable energy source such as ultraviolet light. Such contact lenses comprising the polymer of the present invention have a high oxygen (O.sub.2) permeability, a desirable water content and excellent mechanical properties. Additionally, the contact lenses of the instant invention have improved protein and lipid deposition resistance compared to conventional contact lenses and are softer and more comfortable to wear than rigid gas permeable lenses.... Any ophthalmic lens must meet a variety of criteria in order to be acceptable for wear. Foremost for a contact lens, any material placed over the cornea of the eye must in some way provide for the passage of oxygen to the eye as well as remove waste products away from the eye. With hydrated soft contact lenses this is accomplished by having a material that, inherent with its high water content (sometimes over 50%), passes oxygen to the eye via the water contained in the lens.... Hydrated soft contact lenses, however, can act as a wick, drawing water way from the tear fluid in the eye and hastening its evaporation. This results in the "dry eye" effect, wherein an excess of moisture is drawn away from the eye by the hydrophilic lens.

  Web site: http://www.delphion.com/details?pn=US05648402__

- **Contact lenses having fluorescent colorants and apparatus for making such lenses**

  Inventor(s): Bawa; Rajan (Fairport, NY)

  Assignee(s): Bausch & Lomb Incorporated (Rochester, NY)

  Patent Number: 4,702,574

  Date filed: October 15, 1985

  Abstract: Cosmetic contact lenses, which are tinted with daylight fluorescent pigments in the iris area, can change the wearer's apparent iris color to any desired color, including changing a dark iris to a lighter color such as blue or green.

  Excerpt(s): This invention relates to contact lenses and more particularly to novel contact lenses which are colored with fluorescent colorants. It also relates to apparatus for making such lenses.... The patents of Charles W. Neefe, U.S. Pat. No. 4,460,523 of July 17, 1984 and U.S. Pat. No. 4,472,327 of Sept. 18, 1984, describe methods of making a cosmetic contact lens of novel structure. The lens has an inner circular zone formed of a transparent, colored polymer. Around the circular zone is a concentric annular zone of transparent polymer of the same color as the inner zone in which are dispersed light-reflecting, opaque particles. A second annular zone of clear transparent polymer is formed around the first annulus.... When this novel lens is placed on the eye of a user, the inner circular zone corresponds to the pupil and the first annular zone corresponds to the iris. Although a conventionally tinted contact lens has limited effect on changing the apparent color of the iris, and essentially no effect in lightening the color of dark eyes, in the lens disclosed by Neefe, when light impinges on the reflecting particles dispersed in the colored annular zone, it reflects back as colored light. Consequently, a wearer can have almost any iris color he chooses by wearing such lenses.

  Web site: http://www.delphion.com/details?pn=US04702574__

- **Contact lenses made from thermoformable material**

  Inventor(s): von der Haegen; Harro M. (Laufach, DE), Seiferling; Bernhard (Goldbach, DE)

  Assignee(s): Ciba-Geigy Corporation (Ardsley, NY)

  Patent Number: 5,198,477

  Date filed: February 25, 1992

  Abstract: The invention relates to contact lenses made from a polymer comprising macrocycles that are made up of units of formula I--(--CR.sup.1.dbd.CR.sup.2 --A--)--(I)wherein A is alkylene or alkenylene each having from 3 to 10 carbon atoms and each of which may be substituted by one or more R.sup.3 radicals, each of R.sup.1 and R.sup.2, independently of the other, is hydrogen or lower alkyl, and R.sup.3 is lower alkyl, fluorinated lower alkyl or a siloxane radical.They exhibit a combination of a high degree of hardness and oxygen permeability. They can be produced in an especially advantageous manner, that is to say by hot compression moulding.

  Excerpt(s): The present invention relates to novel contact lenses made from a material that can be processed by hot compression moulding, to the use of that material for the manufacture of contact lenses and to the processes used for the manufacture of those contact lenses.... The contact lenses according to the invention are not water-containing. They exhibit a high degree of strength and, in addition, a suprisingly high oxygen permeability. The Dk values are up to above 100 (Fatt units). The materials on which the

contact lenses are based are low in cost and, furthermore, the manufacture of the contact lenses is carried out in a very efficient manner.... The chosen method of manufacture is the so-called hot compression moulding or thermoforming method, which can be used only with thermoplastic materials. Hitherto, mainly cellulose acetate butyrate (CAB) and polymethyl methacrylate (PMMA) have been suitable for such a method where contact lenses are concerned. With those starting materials, however, it is not possible to obtain contact lenses with comparably high oxygen permeabilities.

Web site: http://www.delphion.com/details?pn=US05198477__

- **Contact lenses of high gas permeability**

  Inventor(s): Loshaek; Samuel (Chicago, IL), Shen; Chah M. (Chicago, IL)

  Assignee(s): Wesley-Jessen Inc. (Chicago, IL)

  Patent Number: 4,228,269

  Date filed: June 8, 1978

  Abstract: This invention relates to bonnets for making contact lenses and contact lenses having high gas permeability shaped from a polymer selected from (a) polymers consisting essentially of the polymerization reaction products of one or a combination of different alkyl styrene monomers with one or more alkyl substituents on the aromatic ring and an unsubstituted vinyl group, and optionally at least one compatible cross-linking monomer, (b) polymers consisting essentially of the polymerization reaction products of at least one alkyl styrene monomer as defined in (a) with one or a combination of other styrene monomers selected from styrene, styrene with an alkyl substituent on the vinyl group only, and styrene with both an alkyl substituent on the vinyl group and one or more alkyl substituents on the aromatic ring, and optionally at least one compatible cross-linking monomer and (c) polymers consisting essentially of the polymerization reaction products of one of the styrenes defined in (a) and (b) or combinations thereof with at least one compatible monoolefinically unsaturated polymerizable monomer, and optionally at least one compatible cross-linking monomer.

  Excerpt(s): Polymethylmethacrylate (PMMA) resins have long been used for the manufacture of contact lenses because of their excellent optical properties and machining and molding characteristics. A major disadvantage of PMMA resins is their very low permeability to gases such as oxygen present in the air and carbon dioxide that is a metabolic waste product produced by the eye. Since the cornea needs a continuous supply of oxygen from the air to provide for ongoing metabolic processes, the low gas permeability of the PMMA resins has necessitated lens designs which ameliorate this problem to some degree. Design changes have included reducing the diameter of the lenses in order to decrease the amount of corneal area covered by the impermeable material and shaping the back surface of the PMMA contact lens to provide for a pumping action and concomitant tear flow under the lens, the tears containing dissolved oxygen from the air.... While such designs have made possible the wearing of contact lenses, significant problems and limitations remain, both because of the inadequacy of the oxygen supply to the cornea and because the designs may produce discomfort and undesirable physiological symptoms to the wearer, frequently to a degree which makes wearing of the contact lens possible for only short periods of time or not at all.... Continued oxygen deprivation of the cornea results in edema or swelling of the cornea which may result in corneal damage. In addition, while oxygen must be supplied to the cornea for its metabolic processes, carbon dioxide, a waste product of these processes must be removed. The same principles apply for providing a route for

removal of carbon dioxide from the cornea as for the transport of oxygen to the cornea, when a contact lens covers the cornea. As used herein, the term "gas permeable" encompasses permeation of said gases through the lens.

Web site: http://www.delphion.com/details?pn=US04228269__

- **Contact lenses of high water content**

  Inventor(s): Loshaek; Samuel (Chicago, IL), Shen; Chah Moh (Chicago, IL)

  Assignee(s): Wesley-Jessen Inc. (Chicago, IL)

  Patent Number: 4,158,089

  Date filed: December 27, 1977

  Abstract: Contact lenses comprising hydrophilic units of which the only or major proportion are derived from an N-vinyl heterocyclic monomer hydrophobic units derived from a hydrophobic monomer, and allylic cross-linking units containing more than one polymerizable double bond selected from monoallyl itaconate, diallyl itaconate, triallyl cyanurate, triallyl isocyanurate, triallyl trimellitate, N,N-diallylmelamine, other multifunctional allyl monomers formed by the esterification of polybasic acids with allyl alcohol, or mixtures thereof; the proportions of said monomers being adjusted to give the desired water content and resistance to dissolution when the polymer is swollen to equilibrium in an aqueous environment.

  Excerpt(s): It is known in the ophthalmological field that oxygen from the air must be made available to the eye in order to provide for the physiological needs of the cornea. There is also the concomitant need for the carbon dioxide produced by corneal metabolic processes to be carried away from the cornea. The placement of a gas impermeable contact lens over the cornea can seriously inhibit the transmission of oxygen to it and result in corneal trauma. This situation has been partially alleviated by the so-called "pump" design of corneal contact lenses which serves to replace the lachrymal fluid under the lens containing carbon dioxide with freshly oxygenated lachrymal fluid and thereby make oxygen available to the cornea. The oxygen deficiency problem has been further alleviated by limiting the length of time for which an impermeable lens can be continuously worn, ranging from about four hours to 16 hours of daytime wear depending on the individual, and no wear during sleeping hours.... It is now known that hydrophilic contact lenses have gas permeability orders of magnitude greater than conventional hard polymethyl methacrylate lenses and, furthermore, the gas permeability generally increases with water content. The term "gas permeability" refers broadly to air, oxygen and carbon dioxide permeability. Thus, hydrophilic contact lenses with high water content are especially desirable. At sufficiently high water contents the increased gas permeability makes possible increased wearing times, even during sleeping hours. The practical use of hydrophilic contact lenses of high water content has, however, been severely limited hitherto because the strength (resistance to tearing, puncturing, etc.) of contact lenses made from high water content polymers, e.g., 70%-95% water, have been found to be low. Strength has been found to decrease progressively with increased water content. Polymers of the prior art which are of sufficiently high water content to give high gas permeabilities, e.g., about 60%-95% by weight of the combined weight of polymer plus water, and especially above about 70% water content, are very weak and are readily torn or otherwise physically damaged during handling. Such polymers are exemplified in British Pat. No. 1,391,438 and U.S. Pat. Nos. 3,639,524 and 3,943,045. These polymers are prepared from monomer compositions which contain a relatively high amount of cross-linking monomer, the

latter being required to prevent the hydrophilic polymer from substantially dissolving in aqueous media. This excessive cross-linking frequently results in a weak polymer. Such high water content hydrophilic polymers are sometimes so fragile that contact lenses made therefrom can only be inserted and removed by a professional practitioner.... Further, the high water content lenses of the prior art cannot withstand repeated heat disinfection, heat sterilization, or cleaning without deterioration or destruction of the lens.

Web site: http://www.delphion.com/details?pn=US04158089__

- **Contact lenses providing improved visual acuity**

  Inventor(s): Chapman; Judith E. (Victor, NY), Cox; Ian G. (Rochester, NY), Biddle; Graham W. (Ontario, NY), Comstock; Timothy L. (Rochester, NY), DeRyke; Kevin J. (Webster, NY)

  Assignee(s): Bausch & Lomb Incorporated (Rochester, NY)

  Patent Number: 6,244,708

  Date filed: September 28, 1998

  Abstract: A method for obtaining contact lenses having optimized visual acuity involves providing the anterior surface or the posterior surface of the contact lens with a conic section having a shape factor value within the range of about 0.3 to 2.0, the shape factor value being selected so as to adjust spherical aberration in the central optical zone to a value within the range of about -0.2 diopter to about -0.6 diopter and to a value that provides optimal visual acuity.

  Excerpt(s): Contact lenses intended for correcting myopia (nearsightedness) or hypermetropia (farsightedness) have a central optical zone that imparts a negative or positive spherical correction (also referred to as power correction) to the lens. Zones peripheral to the optical zone are mainly provided for fitting. The term "spherical contact lens" is often used to denote a contact lens intended for correcting myopia or hypermetropia having spherical or near-spherical surfaces, as distinguished from lenses having a toroidal surface that imparts a cylindrical correction to compensate for an astigmatism. However, as known in the art, even though spherical posterior and anterior surfaces provide acceptable visual acuity, spherical aberration may be introduced into the lens due to the geometry of the lenses. One manner used to compensate for spherical aberration has involved providing a lens surface with asphericity in an attempt to eliminate the spherical aberration.... The present invention provides a method for obtaining contact lenses having improved visual acuity. The method comprising providing at least one of the anterior surface or the posterior surface of the contact lens with a conic section having a shape factor value within the range of about 0.3 to 2.0, the shape factor value being selected so as to adjust spherical aberration in the central optical zone to a value within the range of about -0.2 diopter to about -0.6 diopter and to a value that improves visual acuity.... According to various embodiments, the invention involves correlating conic section shape factors with aberration values within the range of about -0.2 to -0.6 diopter for a specific contact lens design, then determining the aberration value and associated shape factor that improves visual acuity.

  Web site: http://www.delphion.com/details?pn=US06244708__

- **Contact lenses utilizing keel orientation**

  Inventor(s): Cohen; Allen L. (10010 Walsham Ct., Richmond, VA 23233)

  Assignee(s): none reported

  Patent Number: 5,009,497

  Date filed: April 22, 1988

  Abstract: The invention relates to a variety of contact lens designs which attempt to achieve a stable lens orientation by providing such contact lenses with approximately circular profiled grooves or channels. These profiled tracks act as circular keels inhibiting translation and thereby aiding rotational stabilization of the lens.

  Excerpt(s): Ophthalmic contact lens possessing enhanced stability to translational slippage thereby facilitating rotational orientation by providing an arrangement of circular or near-circular profiled grooves cut into the anterior, posterior or both of the lens surfaces.... This invention concerns contact lenses of a variety of designs, from the conventional monofocal, and, as well, contact lenses utilizing phase plate optics, such as phase plate bifocals and "tuned" Fresnel lenses arranged as annular and concentric zones. The latter type of lenses generally follow the unique designs described by Allen L. Cohen in U.S. Pat. Nos. 4,210,391; 4,338,005; and 4,340,283. The bifocal lens design of Cohen, supra, provides that the radii "r.sub.n " of the annular and concentric zones are substantially proportional to.sqroot.n (herein called a "Cohen lens design"). Other characterizations of multifocal lenses which would employ a Cohen lens design in operative embodiments are described by Freeman in U.S. Pat. Nos. 4,637,697; 4,641,934; and 4,642,112.... Contact lenses which utilize prism ballast, peri-ballast, truncation or some other stabilizing means, frequently lack stable lens orientation. Heretofore, this has been true in toric lenses, bifocal lenses and other contact lenses that are not rotationally symmetric. It is desirable to stabilize progressive add contact lenses and other aspheric contact lenses which need to remain in a well centered position on the eye.

  Web site: http://www.delphion.com/details?pn=US05009497__

- **Contact lenses with a colored central area**

  Inventor(s): Foley, Jr. William M. (Glendale, CA)

  Assignee(s): McCarry; John D. (El Toro, CA)

  Patent Number: 4,252,421

  Date filed: November 9, 1978

  Abstract: Contact lenses and a method of preparing the same in which a central area tinted with particular polymer bound or water insoluble colorants are disclosed.

  Excerpt(s): Conventional contact lenses are hard lenses polymerized using the principal co-monomer, methyl methacrylate.... Nearly all of these hard contact lenses are manufactured from lens blanks which are tinted or colored. Hard contact lenses are also known in the field as corneal lenses. Most commonly, hard contact lenses are fitted with a diameter which is less than the diameter of the cornea of the eye. This allows for the entire contact lens to be colored and appear quite natural on the eye.... On Oct. 20, 1978, the Contact Lens Manufacturers Association held a convention in which one of its speakers was the president of Glass-Flex Corporation. During this discussion the speaker mentioned the problems involved in coloring entire hard lenses through the use

of pigments which presented problems in their ability to disperse uniformly throughout the lens.

Web site: http://www.delphion.com/details?pn=US04252421__

- **Contact lenses with constant peripheral geometry**

  Inventor(s): Clutterbuck; Timothy A. (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Care, Inc. (Jacksonville, FL)

  Patent Number: 6,183,082

  Date filed: December 21, 1998

  Abstract: The invention provides contact lenses. In particular, the invention relates to contact lenses in which the geometry of the lens periphery remains constant with changes in the optic zone curvature.

  Excerpt(s): The invention relates to contact lenses. In particular, the invention relates to contact lenses in which the geometry of the lens periphery is constant.... The use of contact lenses for the correction of visual acuity is well known. The front, or convex, surface of contact lens has an optic zone with a curvature for correction of the wearer's visual acuity. Thus, the optic zone curvature will change with changes in the wearer's prescription. This change in optic zone curvature is accompanied by changes in the lens mass and its distribution as well as the geometry of the lens area surrounding the optic zone, or the lens periphery.... The changes in optic zone and lens periphery geometry are problematic in that the changes result in variations in the fit of the lens and, thus, lens performance, as the wearer moves from one prescription to another. In the cases in which the lens prescription necessitates complex mechanical features, such as toric lenses or lenses with cylinder power, even greater variations in fit may be experienced as the lens prescription changes over time. Therefore, a need exists for a contact lens design that overcomes this disadvantage.

  Web site: http://www.delphion.com/details?pn=US06183082__

- **Contact lenses with contoured edges**

  Inventor(s): Jubin; Philippe (Jacksonville, FL), Clutterbuck; Timothy (Jacksonville, FL), Roffman; Jeffery (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Care, Inc. (Jacksonville, FL)

  Patent Number: 6,206,520

  Date filed: March 25, 1999

  Abstract: The invention provides contact lenses that have contoured lens edges that improve lens handling and comfort.

  Excerpt(s): The invention relates to contact lenses. In particular, the invention relates to contact lenses that have contoured edge designs that improve lens handling and comfort.... The use of contact lenses for cosmetics and the correction of visual acuity is well known. Generally, the front, or convex, surface of a contact lens incorporates an optic zone, a lenticular zone, a bevel, and a side wall. The presence of all but the optic zone is necessitated by the need for the contact lens to fit comfortably, for the lens to position itself correctly on the wearer's eye, and for the lens to be easily handled by the

lens wearer.... However, the use of the lenticular zone, bevel, and side wall is problematic. For example, the bevel forms a junction with the lenticular zone, which junction may act as a hinge point allowing the bevel to turn inwardly to, or outwardly from, the wearer's eye. Further, the junction may be sufficiently sharp so as to make the lens uncomfortable to wear. The side wall may also cause discomfort for the wearer. Therefore, a need exists for a lens that overcomes some or all of these disadvantages.

Web site: http://www.delphion.com/details?pn=US06206520__

- **Contact lenses with hydrophilic crosslinkers**

  Inventor(s): Nunez; Ivan (Jacksonville, FL), Molock; Frank F. (Orange Park, FL), Elliott; Laura (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: 5,654,350

  Date filed: June 7, 1995

  Abstract: Hydrophilic contact lenses made using a crosslinking agent of the formulaA--X--(O--(C(O).sub.i --R--(C(O)).sub.i --O--X).sub.n --Awherein R contains one or more cyclic or bicyclic moiety, X is linear or branched alkyl or alkenyl, optionally substituted, and A is acrylate, methacrylate, vinylbenzoyloxy or vinylphenoxy, exhibit superior hydrophilicity, oxygen transmissivity, and physical properties.

  Excerpt(s): The present invention relates to contact lenses made from hydrophilic polymeric material. Such contact lenses, also known often as "soft" contact lenses, are notably comfortable and permit diffusion of water and oxygen therethrough to the cornea.... Hydrophilic polymers used to produce contact lenses are typically homopolymers or copolymers of one or more often more than one monomer. In order to attain structural integrity and strength, the polymer is crosslinked with a small but effective amount of one or more crosslinking agents. Such agents are typically reactive at two different sites, and thereby covalently bond into two different polymer chains and form a stable three-dimensional network.... Crosslinking agents conventionally used in the production of hydrophilic contact lenses, such as ethylene glycol dimethacrylate and diglycidyl bisphenol A dimethacrylate, have been known to exhibit an undesirable tendency to reduce the water content of the lens with increasing content of the crosslinking agent in the lens polymer. This characteristic causes the operator to choose between higher water content (and associated comfort and enhancement of corneal health) and lens strength.

  Web site: http://www.delphion.com/details?pn=US05654350__

- **Contact lenses with off-axis bevel**

  Inventor(s): Clutterbuck; Timothy A. (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: 6,270,218

  Date filed: October 26, 1998

  Abstract: The invention provides contact lenses with off-axis bevels. The bevels aid in increasing stability of the lens on the eye and form a smooth junction with the lenticular zone of the lens.

Excerpt(s): The invention relates to contact lenses. In particular, the invention relates to contact lenses that have an off-axis bevel.... The use of contact lenses for cosmetics and the correction of visual acuity is well known. Generally, contact lenses incorporate a convex surface bevel at the lens' periphery that acts to decrease the lens' edge thickness. Typically, these bevels are rotationally symmetric sections of a sphere. The center of curvature of which is located on the central axis of the lens.... These on-axis bevels form a junction with the non-optical lenticular zone of the lens. This junction is problematic in that it may act as a hinge point for the bevel allowing the bevel to turn in toward, or outwardly from, the wearer's eye. Further, the junction may be sufficiently sharp so as to make the lens uncomfortable to wear. Therefore, a need exists for a bevel that overcomes the disadvantages of the prior art bevel.

Web site: http://www.delphion.com/details?pn=US06270218__

- **Container for a number of packaged contact lenses**

  Inventor(s): Ashley; Charles R. (Pattenburg, NJ), Crossman; Russell J. (Jacksonville, FL), Hennessy; John P. (Jacksonville, FL), Lahm; William J. (Jacksonville, FL)

  Assignee(s): Vistakon, Inc. (Jacksonville, FL)

  Patent Number: 4,986,414

  Date filed: July 13, 1988

  Abstract: A container for a number of sealed packages for individual contact lenses which can hold the individual packages during shipment and storage. The container provides tamper-resistant and tamper-evident features.

  Excerpt(s): The present invention relates to a container for a number of packaged contact lenses, and more particularly, to a container which can hold the individually packaged contact lenses during shipment and storage. The container has tamper resistant and tamper evident features.... In the past soft contact lenses have been packaged in sterile water or saline solution usually in glass bottles with rubber stoppers and foil seals to hold the stoppers in place on the bottle. Such bottled contact lenses can be easily sterilized because the bottles can be stacked in an autoclave. It is not recommended to sterilize soft contact lenses with radiation because the radiation energy affects the material from which the soft contact lenses are made.... A new package for a soft contact lens is shown in U.S. Pat. No. 4,691,820 and assigned to the Assignee of the present invention. This new package has a plastic base with a recess for holding a soft lens in saline solution. The package is sealed with a removable liquid impermeable laminated sheet. It would be desirable to have a container which could be used to hold a number of individually packaged contact lenses for shipping and storage of the individually packaged contact lenses. It would also be desirable to have a container which is tamper resistant and which shows evidence of attempts to tamper.

  Web site: http://www.delphion.com/details?pn=US04986414__

- **Container for contact lenses and a reservoir for contact lens fluid**

  Inventor(s): Amend; Udo (Marchenring 49, D-76199 Karlsruhe, DE)

  Assignee(s): none reported

  Patent Number: 5,381,889

  Date filed: June 23, 1994

  Abstract: A container for contact lenses and for a supply of contact lens fluid has a base body with a receptacle for a removable contact lens etui, a fluid chamber for the contact lens fluid, which partially encloses the receptacle, and a metering connector fastened on the fluid chamber. A contact lens etui housed in the receptacle can be readily taken out of the container and separately taken along.

  Excerpt(s): This application claims the priority of European Application No. EU 93 110 084.6 filed Jun. 24, 1993, which is incorporated herein by reference.... The invention relates to a container for contact lenses and a reservoir for contact lens fluid.... As a rule, wearers of contact lenses must always have the paraphernalia for storing, maintaining, cleaning and disinfecting their contact lenses with them. Besides the container for the contact lenses themselves this includes a substantial supply of contact lens fluid.

  Web site: http://www.delphion.com/details?pn=US05381889__

- **Container for intraocular lenses and contact lenses**

  Inventor(s): Jobe; Michael J. (Forth Worth, TX)

  Assignee(s): Alcon Laboratories, Inc. (Fort Worth, TX)

  Patent Number: 4,738,355

  Date filed: December 24, 1986

  Abstract: A two compartment container adapted for the packaging of intraocular lenses, contact lenses and other small, delicate devices requiring hydrated storage is described. The devices are contained in a first, upper compartment, while a second, lower compartment contains a fluid. The two compartments are placed in fluid communication with each other by means of a narrow passage which prevents the devices in the first compartment from entering the second compartment.

  Excerpt(s): The present invention relates to containers for initial holding and eventual dispensing of intraocular lenses and contact lenses, particularly such lenses made from hydrogels or other similar, soft materials. Such intraocular lenses are described in U.S. Pat. Nos. 4,254,509 (Tennant) and 4,573,998 (Mazzocco) and in European patent application No. 136,807 (Barrett). Reference is made to these publications for further background concerning intraocular lenses made from hydrogels. Because hydrogels have a relatively high water content, it is normally necessary to store these lenses in a physiologically acceptable, sterile fluid prior to use, so that the lenses do not become dehydrated and brittle. Such storage is also a requirement in connection with the packaging of contact lenses made from hydrogels.... Intraocular lenses are very small, with maximum dimensions (e.g., widths) generally on the order of 15 millimeters or less, and frequently 12 millimeters or less. The small size of these lenses can complicate their removal from a container. More particularly, it can be very difficult to locate the lens in a fluid-filled container and/or grasp the lens and remove it from the container. This difficulty represents a significant problem, since ease of removal of a lens from its container is critical to the convenience of the ophthalmic surgeon and is necessary to

facilitate prompt delivery of the lens to the surgeon so that surgical implantation of the lens in the eye of the patient is not delayed or otherwise complicated by difficulties encountered in removing the lens from its container. Similar difficulties are encountered when removing contact lenses from fluid-filled containers.... A principal objective of the present invention is the provision of containers for intraocular lenses which are designed to contain the lenses and a fluid bathing the lenses in a manner such that the lenses may be readily located, grasped and removed from the containers. A further objective of the present invention is the provision of such containers for contact lenses.

Web site: http://www.delphion.com/details?pn=US04738355__

- **Container for storing contact lenses and conditioning them with a liquid that releases gas**

  Inventor(s): Danker; Fred J. (Boonton Township, Morris County, NJ), Hayes; Thomas P. (Waterdown, Ontario, CA)

  Assignee(s): Chiba Vision Inc. (Mississauga, Ontario, CA), Stockwell Ventures Inc. (Panama, PA)

  Patent Number: 4,826,000

  Date filed: December 4, 1987

  Abstract: A storage container or carrying case for contact lenses has a screw-on cap on which baskets for hanging the lenses vertically inside the canister are swingably suspended on a hinge plate which also holds the annular gasket for the cap closure when it is screwed down on the canister. A single helix thread on the outside of a tubular extension of the canister, for meshing with a similar internal thread on the rim of the cap, has a vertically running gap of a few degrees in width and a shallow channel is recessed in the flat flange surface just below the threading at the same orientation as the gap in the thread. The tightness of the closure is thereby readily adjustable to prevent leakage of a treating solution for the lenses from the closed canister in the event that it is knocked over while at the same time permitting escape of gas when the treating liquid includes hydrogen peroxide and a wafer is provided near the flat bottom of the canister to activate or modify the peroxide action.

  Excerpt(s): The present invention concerns containers for contact lenses for facilitating the soaking, storing and rinsing of contact lenses which are also useful as lens carrying cases.... The containers known from U.S. Pat. No. 3,997,049 comprise a fluid-tight type enclosure about 4 cm high comprising a canister and a threaded cap. Within the cap, and hinged thereto, are a pair of basket-like lens receptacles with perforated bottoms and lids. A hinge mounting allows the receptacles to be folded inwardly to confront one another before being inserted within the canister. With the cap removed from the canister the lens receptacles can be swung apart. The arrangement makes it easy for the user to recognize the left and right lens receptacle without the need of a good enough vision to read indicia on the baskets or lids.... The ascepticizing fluid in which the lenses are immersed was often heated. In the known containers above described, the closure produced by screwing on the cap was gas-tight.

  Web site: http://www.delphion.com/details?pn=US04826000__

- **Container for the storage of contact lenses**

  Inventor(s): Umdasch; Stefan (Vienna, AT)

  Assignee(s): Stefen Umdasch Design KG (Vienna, AT)

  Patent Number: 6,286,666

  Date filed: January 25, 2000

  Abstract: The invention relates to a container for storing contact lenses. The inventive container can be filled with a liquid for wetting the contact lenses, and consists of a bottom container part and a top container part. Said top container part can be closed on the bottom container part in such a way that the container is water-tight. A receiving part for receiving the contact lenses is located in the bottom container part. A lid part which is provided in the top container part interacts with the receiving part in the bottom container part when the container is closed.

  Excerpt(s): The invention concerns a container for storing contact lenses which can be filled with a liquid for wetting the contact lenses.... Containers for storing contact lenses are known in various designs. Usually such containers are filled with a disinfecting liquid and for their storage, in particular for overnight storage, the contact lenses are put into the liquid and the container is closed. The removal of contact lenses from such containers filled with liquid is not always easy, since on the one hand the contact lenses when immersed in liquid are difficult to see with the naked eye and on the other, to grasp the contact lenses in the liquid is not always easy. It is therefore suggested in U.S. Pat. No. 5,167,323 that the contact lenses should be placed in a kind of basket-like container and to connect this basket-like container thereafter with a vessel open at the top. This connection, for example, takes place by screwing on a cover which has on its underside the container. But with such a procedure there is still the danger that the contact lenses will not be completely immersed in the liquid if the container is not filled exactly to its minimal level with disinfecting liquid. When opening the container to remove the contact lenses, there is furthermore the danger that the liquid will drip outside the container, and then this causes the necessity for cleaning.... In addition, a container for storing contact lenses is known from U.S. Pat. No. 4,942,959, which comprises two compartments disposed adjacent to each other and separate from each other. Each compartment is provided for the accommodation of one contact lens and can be closed by one cap each. Each compartment has a removal device with convex surface to place a contact lens on it. The removal device can be removed from the container filled with liquid by opening and closing the covers or it can be lowered into the container. Thus it is possible to remove a contact lens from the compartment concerned without the fingers coming into contact with the liquid. However with this known container a complete rinsing of the contact lenses is not guaranteed, if there is not a sufficient liquid level in the individual compartments. Moreover the removal device which can be lowered and raised requires a comparatively complicated structure of the container and therefore high production costs.

  Web site: http://www.delphion.com/details?pn=US06286666__

- **Cross-linked alkyl methacrylate-N-vinyllactam polymer composition for use in soft contact lenses**

  Inventor(s): Hosaka; Shuntaro (Kamakura, JP)

  Assignee(s): Toray Industries, Inc. (Tokyo, JP)

  Patent Number: 4,184,992

  Date filed: November 3, 1977

  Abstract: Provided is a cross-linked polymer composition which can be in a transparent polymeric gel form having an equilibrium water content of at least 60 wt.% for use in soft contact lenses. The cross-linked polymer composition is prepared by polymerizing, using a bulk polymerization procedure, a monomer mixture comprising an alkyl methacrylate and an N-vinyllactam in the presence of a cross-linking agent comprising at least one compound selected from vinyl acrylate, vinyl methacrylate, triallyl isocyanurate and vinyl carboxylates expressed by the formula:R--COOCH.dbd.CH.sub.2).sub.nwhere R is a hydrocarbon radical having 1 to 10 carbon atoms and n is an integer of 2, 3 or 4.

  Excerpt(s): Water-containing gels of 2-hydroxyethyl methacrylate (hereinafter referred to as "HEMA" for brevity) polymers have been widely used in so-called "soft contact lenses", because soft contact lenses made from such water-containing gels possess good transparency and do not irritate the eyeballs during wearing. However, these soft contact lenses are poor in permeability to some substances such as oxygen. When the soft contact lenses are worn during sleeping, cornea lesions sometimes occurred due to shortage of oxygen. Therefore, such lens must be removed before sleeping.... In general, permeability of water-containing polymeric gels to oxygen increases with an increase of the water content. Therefore, HEMA/N-vinylpyrrolidone copolymer gels have recently been proposed for use in making soft contact lenses. Such gels are prepared by copolymerizing HEMA with N-vinylpyrrolidone or graft-copolymerizing HEMA onto poly-N-vinylpyrrolidone. The HEMA/N-vinylpyrrolidone copolymer gels exhibit an equilibrium water content of 70% or more at 37.degree. C., although a HEMA homopolymer gel has an equilibrium water content of less than about 40%. However, the HEMA/N-vinylpyrrolidone copolymer gels are still not satisfactory in that they are poor in mechanical strengths. Accordingly, soft contact lenses made therefrom are liable to be fragile.... Cross-linked copolymers of N-vinyllactam and other methacrylic acid esters such as methyl methacrylate have also been proposed for use in soft contact lenses. Water-containing gels of these cross-linked copolymers generally exhibit somewhat improved mechanical strengths as compared with HEMA/N-vinylpyrrolidone copolymers. Various cross-linking agents have been proposed for use in the preparation of these cross-linked copolymers. For example, U.S. Pat. No. 3,532,679 discloses the use of tetraethylene glycol dimethacrylate. British Pat. No. 1,391,438 discloses the use of divinylbenzene, ethylene glycol dimethacrylate, allyl methacrylte, diethylene glycol bis(allylcarbonate) and the like. However, these cross-linked N-vinyllactam/methacrylic acid ester copolymers are still not satisfactory as materials for use in soft contact lenses which can be worn continuously for a long period of time, because they do not comletely safisfy the requisites stated below.

  Web site: http://www.delphion.com/details?pn=US04184992__

- **Cross-linked hydrogel copolymers for contact lenses**

  Inventor(s): Atkinson; Ivor B. (Chessington, GB2), Holdstock; Barry C. (Morden, GB2)

  Assignee(s): Global Vision (U.K.) Ltd. (Hants, GB2)

  Patent Number: 4,361,657

  Date filed: November 29, 1979

  Abstract: The invention relates to soft contact lenses having a water content of at least about 45% and comprising a hydrated copolymer of a major proportion of an hydroxyalkyl acrylate or methacrylate, up to 12% by weight of an ethylenically unsaturated acid or anhydride, a minor proportion of a cross-linking monomer and a minor proportion of styrene or a substituted styrene, the free acid or anhydride groups being in salt form.

  Excerpt(s): This invention relates to contact lenses and in particular to so-called soft contact lenses which are formed from a hydrogel of a hydrophilic polymer.... In British Pat. No. 1,475,605 (J. T. de Carle) contact lenses are described which are formed from 10 to 60% of a vinyl lactam (e.g. vinyl pyrrolidone), up to 3% of a cross-linking agent, such as ethylene glycol dimethacrylate, 0.25 to 5.6% of an unsaturated acid, such as methacrylic acid, the balance being an hydroxyalkyl acrylate or methacrylate. The resulting polymer is hydrophilic and on immersion in an aqueous alkali, carboxylate groups are formed which impart a high degree of water-absorbancy to the polymer. As a consequence the water-swollen gel-like polymers may be produced having water contents up to and above 75% by weight of the hydrated polymer and lenses manufactured from such polymers exhibit a very high atmospheric oxygen transmission rate when in hydrogel form. In fact, the permeability of the lenses to oxygen is so good that the lenses can be worn for extended periods i.e. they need not be removed after 8 hour wearing periods, which is necessary for other commercial lenses in order to satisfy the oxygen requirements of the cornea.... One problem which has been encountered with lenses manufactured in accordance with the above Patent is that they require to be handled with moderate care in order to avoid tearing the lenses when inserting or removing them.

  Web site: http://www.delphion.com/details?pn=US04361657__

- **Detergent composition for contact lenses**

  Inventor(s): Miyajima; Nobuyuki (Tokyo, JP), Hata; Kenji (Tokyo, JP), Nakayama; Junichi (Chiba, JP)

  Assignee(s): Lion Corporation (Tokyo, JP), Toyo Contact Lens Co., Ltd. (Nagoya, JP)

  Patent Number: 4,710,313

  Date filed: June 12, 1986

  Abstract: This invention provides a detergent composition by which proteinaceous depositions can be easily removed from contact lenses in a short time, and method for removing such depositions from the contact lenses. The detergent composition comprises (A) at least one glycosidase selected from the group consisting of amylase, cellulase, pectinase, hemicellulase, alginase, heparinase and dextranase; and (B) at least one activator selected from the group consisting of urea, thiourea, acid salts of guanidine, reductants, amino acids and salts thereof.

Excerpt(s): This invention relates to a detergent composition for contact lenses, in particular a detergent composition which is useful for removing proteinaceous depositions or retentions from contact lenses. This invention also relates to a method of removing such depositions and retentions from contact lenses.... Among contact lenses, there are hard contact lenses composed primarily of methyl methacrylate, soft contact lenses comprising 2-hydroxy methacrylate, and N-vinyl pyrolidone or silicone contact lenses which are made by subjecting the surface of a hydrophobic material made from polysiloxane series to an electrical discharge in order to make its surface hydrophilic. Since, in particular, soft contact lenses and silicone contact lenses are flexible, good in oxygen permeability and since they can easily be fitted when these lenses are on the eyes, these lenses are widely used nowadays.... When such flexible contact lenses are worn for a long time, lipid, protein, mucin in tear and bacteria are deposited on the surface and into the mass thereof. Those depositions make the lenses opaque and also injure the eye.

Web site: http://www.delphion.com/details?pn=US04710313__

- **Device and method for cleaning contact lenses**

  Inventor(s): Horian; Richard C. (11952 Montana Ave., #102, Los Angeles, CA 90049)

  Assignee(s): none reported

  Patent Number: 6,289,907

  Date filed: February 4, 1999

  Abstract: A device for cleaning soft contact lenses includes a cage having two cavities to loosely receive soft contact lenses therein. The cavities are defined by spaced ribs and provide surfaces approximating the surfaces of the lenses to be contained therein. The cage is positionable within a container which is fluid tight and can be associated with a rotary drive. The drive is oriented to rotate the container in a horizontal axis. The container includes an appropriate fill line allowing filling of one-half of the internal volume of the container with multipurpose liquid or cleaning solution. The rims of the lenses contained within the cage are arranged with the planes of such lenses substantially parallel to the axis of rotation and displaced from that axis to accommodate lifting the lenses repeatedly out of the body of liquid and then fully immersing them. A method for cleaning contact lenses includes loosely containing the lens so that it may move about the cage, repeatedly moving the lens fully into and out of a body of liquid through rotation in a substantially horizontal axis. The lenses are rotated slowly at three to ten revolutions per minute.

  Excerpt(s): The field of the present invention is cleaning systems for soft contact lenses.... There have been many devices considered over the years to automatically clean soft contact lenses. These devices have varied in their levels of effectiveness, safety to the lens and wearer, cost of materials required and cost of the device itself. The disadvantages in effectiveness and practicality of such devices have left the preferred method of cleaning lenses recommended by most manufacturers to be that of manual cleaning by the wearer.... The current, most widely recommended method of cleaning is for the wearer to wash their hands, remove the contact lenses, position the lenses in the cupped palm or between two fingers and physically rub the lenses with a finger in conjunction with applying cleaning fluid designed for the purpose. In recent years, this task has been made a bit simpler by the development of "all-in-one" contact lens fluid formulations. These formulations allow a single fluid to be used to store, rinse, disinfect and clean the contact lenses. However, due to the relative levels of effectiveness and

practicality, no simple automated machine has been found to be in widespread use. Manual cleaning as described above remains as the predominant method of choice.

Web site: http://www.delphion.com/details?pn=US06289907__

- **Device for cleaning contact lenses**

  Inventor(s): Wild; Patricia (Onchan, GB3)

  Assignee(s): Zygi Limited (Isle of Man, GB)

  Patent Number: 5,598,860

  Date filed: May 19, 1995

  Abstract: A device for cleaning contact lenses comprises three liquid containers removably mounted one above another on a support. Each container has a liquid inlet and the two upper containers each have a liquid outlet, controlled by a valve in communication with the inlet of the container below it. In use, contact lenses are initially immersed in sterilizing solution in the middle container, and the upper container contains neutralizing solution. After a preset interval, a timed valve control device on the support operates the valves in sequence to discharge the sterilizing solution from the middle container into the lower container, and replace it with sterilizing solution from the upper container.

  Excerpt(s): The invention relates to devices for cleaning contact lenses.... As is well known, contact lenses normally require, at intervals, to spend a period immersed in a sterilising solution. Typically, the user will store the lenses in an appropriate solution overnight. There are available one-step solutions where the lenses are placed in the solution at night, preferably after cleaning, and are simply removed from the solution and inserted in the eyes in the morning.... However, a two-step method is often considered to be superior, where the lenses are placed in a sterilising solution, typically hydrogen peroxide solution, following which the lenses are immersed in a neutralising solution. Although lenses are usually immersed in the sterilising solution overnight, one advantage of the two-step method is that the sterilising step can take as little as 30 minutes, followed by the neutralisation step of 10 minutes or so. As well as the two-step method being preferred, it may also be the only method available to someone who is allergic to some extent to solutions used in the one-step method.

  Web site: http://www.delphion.com/details?pn=US05598860__

- **Device for inserting and removing contact lenses**

  Inventor(s): England; Robert C. (P.O. Box 229, Zanesville, OH 43701)

  Assignee(s): none reported

  Patent Number: 4,512,602

  Date filed: November 17, 1983

  Abstract: The disclosure is directed to a device for inserting and removing contact lenses formed from an elongated body of resilient material having opposite terminal end portions and a central longitudinal axis, a first of the end portions having a relatively shallow concavely outwardly opening locating surface upon which a contact lens will be retained incident to inserting the lens upon an eye, a second of the terminal end portions being of a frusto-conical configuration on a narrow end of which is a suction cup having

a concavely outwardly opening locating surface upon which a contact lens will be retained upon removing the lens from an eye, the concave surfaces having generally parallel radii of generation which are normal to a common plane defining a generally 45 degree angle with the central axis, and the latter relationship allows complete visibility during insertion or removal of contact lenses, particularly when a mirror is being utilized and more particularly when the user has very poor or limited vision.

Excerpt(s): The present invention is directed to a novel device for inserting and removing contact lenses with devices of this type being disclosed in U.S. Pat. No. 4,190,277 and 4,097,081 issued respectively on Feb. 26, 1980 and June 27, 1978 to Robert C. England. The present invention is more specifically directed to an improvement of the suction cup device of Patent No. 4,097,081 in which the radius of generation of the suction cup is coincident to the axis of the body of the device which inherently obstructs visibility when one is utilizing the device in association with a mirror to insert or remove contact lenses relative to an eye.... Essentially, hard contact lenses have been removed from the human eye by two methods, namely, manual manipulation and by suction cup devices, such as that disclosed in U.S. Pat. No. 4,097,081. The suction cup devices utilize either static suction created by a resilient hollow curved suction cup or by active suction created by a resilient curve cup and a bulb or medicine dropper-like chamber. Insofar as the insertion of contact lenses is concerned, such has previously been done by placing the lens on the eye with one's fingertip, by use of hollow cup-like shaped devices attached to thimble-type finger attachments, or by hollow suctionless devices.... The primary disadvantage of known removal devices, be they of the static suction or active suction type, resides in the difficulty of accurately aligning the suction cups with a lens which is to be removed. This is particularly true when a mirror is being utilized, and the device of the type disclosed in U.S. Pat. No. 4,097,081 in which the device is virtually in line with the eye and the lens to be removed therefrom and, therefore, causes obstruction when the user looks into a mirror as is most often the case when a contact lens is being removed. Obviously, the same problem is associated with the utilization of a manual inserting device which must similarly be virtually aligned directly along the line of sight when a lens is to be inserted upon the eye.

Web site: http://www.delphion.com/details?pn=US04512602__

- **Device for inspecting contact lenses**

  Inventor(s): Bieri; Fritz (Johannisbergstrasse 69, CH 8645 Jona, CH)

  Assignee(s): none reported

  Patent Number: 5,173,738

  Date filed: May 7, 1990

  Abstract: The device is useful for detecting deposts on the surface of contact lenses and changes in the material of the contact lenses. It consists of an optically transparent rod-shaped body (1) with two end faces. One end face (2), in which the contact lens is placed, has a smooth surface and can be spherical, aspherical or toroidal, with a curvature in the range of that of the contact lens to be examined. The other end face (3) has a smooth or mat surface and can be flat, convex or concave. The rod-shaped body (1) may also be assembled from elements (4, 8, 11). The device is cheap to manufacture and simple for occulists, opticians and wearers of contact lenses to use.

  Excerpt(s): The invention relates to a device for inspecting contact lenses which enables the verification of deposits on the surface and changes in the material of the contact

lenses.... As is known, organic and inorganic deposits are formed on the surfaces of the contact lenses, and microorganisms as well as fungi also collect there. The organic deposits are parts of the lacrimal fluid such as proteins, mucines and lipids. The inorganic deposits (metal, iron, rust) are due to environmental conditions (air pollution, road dust, metal abrasives). Additional inorganic deposits are those of calcium salts which are also called hard water deposits. They are formed when flushing the lenses with tap water or due to a change of the pH value of the lacrimal fluid, e.g. due to medicaments or physiological influences. The microorganisms (bacteria, virus) and fungi belong to the normal microflora of the conjuctiva, the conjuctive sac and the lacrimal ducts. The normal microflora change as soon as the balance of the microflora becomes disturbed, be it due to germ transfer via the hands, improper cleaning and desinfection, illness or metabolic disturbances (diabetic) of the lens wearer or due to contact of the lenses with the environment. In addition it is known that the contact lenses, in the course of their use, are subjected to changes, such as changes and damage of their material. The changes of the material, e.g. discolorations, are based on environmental influences, e.g. cigarette smoke, colored vapors, cosmetics, or stains transferred from storage containers. Damage may be in form of hairline cracks, abrasions, scratches, marginal fractures or breaks, and due to improper handling of the contact lenses.... contact lens viewing in black field illumination by using a binocular microscope.

Web site: http://www.delphion.com/details?pn=US05173738__

- **Device for packaging and treating bactericide for contact lenses**

  Inventor(s): Bougamont; Jean-Louis (Eu, FR), Hennemann; Pascal (Eu, FR), Leuliet; David (Mers les Bains, FR)

  Assignee(s): Rexam Sofab (Le Treport, FR)

  Patent Number: 6,318,549

  Date filed: October 13, 2000

  Abstract: The invention relates to a packaging and bactericidal treatment device for contact lenses (L), said device being characterized in that it comprises: firstly a housing (1) provided with at least one cavity (10) receiving a support element (11) which has bactericidal action and whose outside face (11a) has curvature matching the curvature of the contact lenses (L); and secondly, at least one lid (2) designed to cover said cavity (10) and whose inside face is provided with at least one socket (20) which is suitable for being engaged in guided manner into said cavity (10), and which receives a wedge element (21) having bactericidal action and whose outside face (21a) has curvature complementary to the curvature of the support element (11) so that it protects and/or decontaminates a contact lens (L) by holding it stationary in said cavity (10) between said support element (11) and said wedge element (21).

  Excerpt(s): The present invention relates to a packaging and bactericidal treatment device for contact lenses.... In order to avoid any infection of the eyes, it is essential for contact lenses to be protected from any bacterial contamination, or else to be decontaminated before they are put in place on the cornea.... That is why devices exist for enabling contact lenses to be immersed in a bactericidal treatment solution. Such a device includes, in particular, means for suspending said contact lenses, which means are generally associated with means for closing the container of bactericidal solution.

  Web site: http://www.delphion.com/details?pn=US06318549__

- **Device for removing and replacing soft contact lenses worn on the human eye**

  Inventor(s): Cointment; Delma M. (914 Pontalba St., New Orleans, LA 70124)

  Assignee(s): none reported

  Patent Number: 4,332,408

  Date filed: August 18, 1980

  Abstract: Squeezed, the flexible cup of the device forms two convex lips which grip a soft contact lens in place on a human eye, deforms the lens, breaking its fluid suction-bond to the eye, allowing easy and gentle removal of the lens from the eye, without fingers touching the eye. The body of the device has a dished end with an elevated rim, an annular lumen and a depressed central segment, which end safely holds soft contact lenses by the variable suction of a flexible bulb, controllable by sliding the other end of the body into the lumen of the bulb. The lens is released by squeezing the bulb.

  Excerpt(s): This invention is a device for the removal, handling and replacement of soft contact lenses worn on the cornea of the human eye. It consists of a flexible cup, a body and a bulb. The flexible cup is used for the removal of a soft contact lens from the eye. Squeezed by the fingers, the cup forms two convex lips which grip and gently deform the lens, breaking its fluid suction-bond to the cornea and holding the lens for removal. One end of the body of the device is designed to hold soft contact lenses without significant deformation, for handling and for replacing the lens on the eye. A flexible bulb at the other end of the body slides along the body for varying the volume of the lumen of the bulb, to vary the suction for holding the lens and pressure for releasing it. The fingers do not touch the eye during use of the device.... In the current state of the art, contact lenses are worn over the cornea of the human eye for the correction of visual defects. The lenses are of two types, hard and soft and both are held to the cornea by a fluid suction-bond. The hard lenses afford correction by the difference in curvature of their inner and outer surfaces. The fluid suction-bond of the soft lens to the eye shapes the inner curvature of the soft lens to the curvature of the cornea, so the correction these lenses afford is due to the difference in curvature of the cornea of the eye and the curvature of the outer surface of the soft lens. Hard contact lenses are of diameters usually less than the diameter of the cornea they cover, while soft contact lenses are usually larger in diameter than the cornea, or almost as large as the cornea. When a hard lens is to be removed from the eye, it is moved off of the cornea, on to the sclera, by a finger or by a suction cup device, to a point where the curvature of the eye is different from the fixed curvature of the undersurface of the hard lens. The difference in curvature breaks the fluid suction-bond of the hard lens to the eye, allowing easy removal of the lens. A soft lens moved off of the cornea by a finger or by a suction cup, does not respond as does the hard lens. The soft contact lens, so moved, merely alters its shape and continues to conform to the external surface of the eye. The fluid suction-bond of the soft lens to the eye does not break and the lens cannot be removed from the eye without considerable pushing, manipulation and pulling. Pushing on the eye is very undesirable and when a soft lens on the eye is pulled, the fluid suction-bond of the lens to the eye holds and the eye itself is pulled out of shape, which is capable of causing injury to the eye.... Devices used to grip or hold hard contact lenses are either simple suction cups or else they are cups which apply suction to the lens through a single hole in the cup. These devices are completely unsatisfactory for handling soft contact lenses. They do not break the fluid suction-bond of the soft lens to the eye and pulling on them transmits the pull through the soft lens to pulling of the eye itself. The plain suction cups

do not release soft contact lenses when the lenses are positioned on the eye and those devices which apply suction through a single hole do not hold soft lenses at all well and distort the lenses at the point of suction to where the lenses can be damaged.

Web site: http://www.delphion.com/details?pn=US04332408__

- **Device for storage and insertion of contact lenses**

  Inventor(s): Reinson; Lorne R. (White City, CA), Akerman; Mark J. (Regina, CA), Klippenstein; John (White City, CA)

  Assignee(s): Lens-O-Matic Inc. (White City, CA)

  Patent Number: 5,069,494

  Date filed: October 5, 1990

  Abstract: A device for removing, storing and applying contact lenses comprises a plurality of compartments arranged axially spaced in a cylindrical body with the base of each compartment formed by a portion which can be unscrewed from the remainder and which defines the cover for the next adjacent portion. An end compartment receives an applicaator head which is stored within the compartment in a suitable liquid. The applicator includes a suction bulb and the head which is in the form of a cylindrical body having a peripheral edge of approximately the diameter of the outer edge of the lens and a membrane extending across the cylindrial body. The membrane has an upper surface for engaging the lens which is perforated so that suction applied by the bulb draws the lens onto the membrane and then further suction distorts the membrane to pull the sides of the cylindrical portion inwardly to pinch the lens and break the seal.

  Excerpt(s): This invention relates to a device for storage and insertion of contact lenses. As is well known contact lenses have achieved many advances in the past 25 years which have led to widespread use for correction of various sight defects. Soft lenses have particularly increased in popularity in view of their increased comfort and ability to provide extended wear characteristics. Such soft lenses tend to be larger in diameter than hard lenses having an outside diameter approximately equal to or slightly greater than the iris of the eye. This makes them much more difficult to apply to the eye even by experienced users and this difficulty can prevent new users from continuing to use the lenses. In addition the flexibility of the lenses enables them to accommodate closely to the outside shape of the eye and thus the suction forces generated between the eye and the lens can be extremely strong making it difficult to remove the lens. Removal is generally carried out by pinching the lens so that it is squeezed away from the eye thus breaking the seal and enabling the lens to be pulled away from the eye.... This is normally carried out by the fingers of the wearer which necessarily causes the lens to be handled and thus come into contact with any foreign bodies or contamination on the fingers of the wearer.... Various proposals have been made dating back to 1958 for devices to assist in storing and applying contact lenses.

  Web site: http://www.delphion.com/details?pn=US05069494__

- **Disinfecting and cleaning system for contact lenses**

  Inventor(s): Wisotzki; Klaus-Dieter (Erkrath, DE), Bansemir; Klaus (Langenfeld, DE), Jacobs; Jochen (Wuppertal, DE), Kruse; Hans (Korschenbroich, DE)

  Assignee(s): Henkel Kommanditgesellshaft auf Aktien (Duesseldorf, DE)

  Patent Number: 4,775,424

  Date filed: July 30, 1987

  Abstract: A two component disinfecting and cleaning system for contact lenses comprising a first component containing a peroxo compound and an alkyl glucoside and a second component containing an H.sub.2 O.sub.2 -neutralilzing agent and a buffer salt in an amount sufficient to adjust the pH of an aqueous contact lens solution containing the first and second components to about 7.

  Excerpt(s): This invention relates to a disinfecting and cleaning system for contact lenses using a peroxo compound.... The increasing number of wearers of soft or hard contact lenses necessitates the provision of a system of sterilizing and cleaning preparations which is both convenient and safe to use. Peroxo compounds which destroy germs and fungi are mainly used for this purpose, although any excesses thereof must be destroyed again before the lenses are replaced on the pupil.... Thus, CA U.S. Pat. No. 1,099,885 uses a redox system, for example of ascorbic acid and alkali percarbonate showing a strongly alkaline reaction in aqueous solution, for disinfecting and cleaning contact lenses, the contact lenses being placed in an aqueous solution of this redox system for about 5 minutes. After disinfection, the lenses are optionally rinsed with sodium chloride solution. They may then be replaced on the eyes.

  Web site: http://www.delphion.com/details?pn=US04775424__

- **Disinfecting solutions for hydrophilic contact lenses**

  Inventor(s): Lucas; Donald S. (Fairfield, OH), Mustacich; Robert V. (Fairfield, OH), Stone; Roger L. (Fairfield, OH)

  Assignee(s): The Procter & Gamble Company (Cincinnati, OH)

  Patent Number: 4,410,442

  Date filed: January 13, 1982

  Abstract: Disinfecting solutions for use with hydrophilic soft contact lenses, containing effective amounts of C.sub.5 -C.sub.12 fatty acids, especially octanoic acid, are disclosed. These solutions provide broad spectrum antimicrobial efficacy together with rapid and complete desorption of the fatty acid antimicrobial from the contact lens material, resulting in a minimization of irritation and sensitization risks to the user. The method of disinfecting hydrophilic soft contact lenses using C.sub.5 -C.sub.12 fatty acids is also disclosed.

  Excerpt(s): The present invention relates to aqueous solutions used for the cleaning, disinfecting and storing of hydrophilic soft contact lenses.... Hydrophilic or partially hydrophilic plastic materials have been used in making "soft" contact lenses. For example, U.S. Pat. Nos. 3,503,393 and 2,976,576 describe processes for producing three dimensional hydrophilic polymers of polyhydroxyethylmethacrylate in aqueous reaction media; these polymers have low degrees of cross-linking in their hydrogel structure and have the appearance of elastic, soft, transparent hydrogels. Soft contact lenses have also been made out of silicone and other optically suitable flexible materials.

The popularity of soft contact lenses is growing rapidly. The major virtues of these lenses are their softness (providing comfort to the wearer), permeability to gases, and their optical suitability. The hydrophilic lenses are particularly useful for ophthalmological applications due to their ability to absorb water with a concomitant swelling to a soft mass of extremely good mechanical strength, their complete transparency, and their ability to retain shape and dimension when equilibrated in a given fluid.... One very basic problem associated with soft contact lenses is the development of a convenient, safe and effective method for disinfecting and cleaning them. The fact that these lenses are hydrophilic (compared with hard contact lenses) makes them a good environment for breeding microbial contamination; this requires that the lenses be well-disinfected prior to each use. The properties of the polymers used in the lenses allows conventional preservatives and antimicrobials, which might otherwise be used for cleaning and disinfecting, to be absorbed annd concentrated in the lenses and later released when the contact lenses are on the eye. The release of such antimicrobial and preservative materials is generally much slower than the uptake, thereby allowing them to build up in the lenses. This buildup may eventually affect the physical characteristics of the lenses, including their dimension and color. The net result of this process can be the damaging or staining of the contact lens, itself, and/or harming the sensitive conjunctival or corneal tissue in the eye.

Web site: http://www.delphion.com/details?pn=US04410442__

- **Disinfection and cleaner of contact lenses**

  Inventor(s): Sorensen; Thomas Lykke (Raleigh, NC), Christensen; Flemming Mark (Neuilly-sur-Seine, FR)

  Assignee(s): Novo Nordisk A/S (Bagsv.ae butted.rd, DK)

  Patent Number: 5,919,698

  Date filed: February 11, 1998

  Abstract: The present invention relates to a one-step method for disinfection and cleaning of contact lenses of the type using hydrogen peroxide as the disinfecting agent and a protease as the cleaning agent, comprising the following steps: a) disinfection of the contact lenses in an aqueous disinfecting solution comprising from 1 wt. % to 5 wt. % hydrogen peroxide at a pH not acceptable to the eyes, b) cleaning the contact lenses by subjecting the contact lenses to a protease being inactivated within a period of time at a pH level not acceptable to the eyes, c) neutralization of the hydrogen peroxide in the aqueous disinfecting solution with a microbial catalase being substantially active at pH 3.0 to 7.0, d) adjusting the pH in the aqueous disinfecting solution to a pH level acceptable to the eyes. Further, the invention relates to a tablet or capsule suitable for one-step disinfection and cleaning, a one-step disinfecting and cleaning system and further a one-step procedure for disinfection and cleaning contact lenses.

  Excerpt(s): The present invention relates to a one-step method for disinfecting and cleaning contact lenses of the type using hydrogen peroxide as the disinfecting agent, a protease as the cleaning agent and a catalase for neutralizing the hydrogen peroxide in the aqueous disinfecting solution.... Further, the invention relates to a tablet or capsule suitable for one-step disinfection and cleaning, a one-step disinfection and cleaning system and further a one-step procedure for disinfection and cleaning contact lenses.... Quite a lot of people today prefer wearing contact lenses to glasses. Some people use contact lenses for aesthetic reasons, as they believe that glasses make them look awkward. Other people value the freedom of movement that contact lenses give, which

is advantageous when e.g. playing a game of soccer or attending a high-impact aerobics class. Then again some people just do not like the inconvenience of polishing greasy glasses.

Web site: http://www.delphion.com/details?pn=US05919698__

- **Disinfection of contact lenses**

  Inventor(s): Davies; David J. G. (Bath, GB), Meakin; Brian J. (Bath, GB), Rees; John E. (Bath, GB)

  Assignee(s): University of Bath (Bath, GB)

  Patent Number: 4,642,234

  Date filed: May 14, 1985

  Abstract: Hydrophilic soft contact lenses are disinfected by soaking in a non-eye-irritant aqueous disinfecting solution obtained by the addition to tap water of a chlorhexidine salt, a sequestering agent for calcium and magnesium ions, and a dechlorinating agent. Suitably, the solution is obtained by dissolving a tablet in tap water. The preferred sequestering agent is sodium tripolyphosphate and the preferred dechlorinating agent is sodium thiosulphate. Advantageously, the chlorhexidine salt is provided in solid solution in urea to assist complete dissolution.

  Excerpt(s): The present invention relates to the disinfection of contact lenses and has particular, but not exclusive, application to the disinfection of hydrophilic soft contact lenses. It provides aqueous disinfecting solutions, compositions for making said solutions, and methods of disinfecting hydrophilic soft contact lenses.... Contact lenses are thin convex lenses placed directly on the eye surface to correct sight defects. There are two general categories of contact lenses, namely hard lenses and soft lenses. Hard lenses are made of glass or, more usually, hard plastics, especially cross-linked polymethylmethacrylate. Soft lenses may be made of hydrophobic plastics, especially cross-linked dimethyl polysiloxane, but usually are made of hydrophilic plastics, especially polyhydroxyethyl methacrylate cross-linked with hydroxyethyl dimethacrylate.... The disinfection of hydrophilic soft lenses using chemical agents presents a particular problem in that the lenses can absorb chemical agents from disinfecting solutions in which they are soaked. The most commonly used disinfecting solutions for soft contact lenses are aqueous solutions containing a chlorhexidine salt and it is well established that a sufficiently high concentration of chlorhexidine salt can build up in the lens to cause irritation and, sometimes, damage to the eye of the lens wearer. Accordingly, the concentration of chlorhexidine salt in the disinfecting solution should be maintained at a sufficiently low, but effective, level (below about 0.005% by weight, calculated as chlorhexidine digluconate) to reduce the risk of eye irritation. It has recently been proposed in UK Patent Specification No. 2090013A that eye irritancy resultant from chlorhexidine salt disinfection can be obviated by the use of a substantially isotonic aqueous solution containing 0.0012 to 0.003% of a chlorhexidine salt if the ionic species of the tonicity adjusting agent produces a tonicity equivalent to not more than a 0.3% solution of sodium chloride.

  Web site: http://www.delphion.com/details?pn=US04642234__

- **Disinfection system for disinfection of contact lenses**

  Inventor(s): Andersen; Thorkild (Siriusvej 13, DK-8370 Hadsten, DK)

  Assignee(s): none reported

  Patent Number: 5,993,755

  Date filed: October 17, 1997

  Abstract: A disinfection system and method for contact lenses that ensures that a disinfection liquid maintains its strength until the moment it is used. The system includes a lens case specially adapted to receive a prepackaged disposable container of disinfection liquid, the opening of which is provided with a tear-off seal to be removed immediately before use. The disposable container contains an amount of disinfection liquid suitable for one disinfection procedure for a set of contact lenses. The use of the disposable container system obviates bacterial growth in the container of the lens case.

  Excerpt(s): The invention concerns a disinfection system for disinfection of contact lenses and comprising a sealed disposable package containing a suitable amount of disinfection liquid to disinfect a set of contact lenses.... Users of contact lenses are aware that, at best, contact lenses are to be cleaned and disinfected daily to avoid trouble in use.... In practice, disinfection of contact lenses takes place in that a disinfection liquid from a container is poured into a specially designed lens case in which the cleaning process takes place. The lens case consists of a lens holder with a lens basket usually secured to the underside of the lens case lid as well as a container to receive disinfection/neutralization liquid onto which the lid may be screwed. When the contact lenses have been placed in the lens baskets, the lens case lid is screwed on the case, whereby the lens baskets with the contact lenses are immersed into the disinfection liquid in the container and are thereby cleaned.

  Web site: http://www.delphion.com/details?pn=US05993755__

- **Disinfector units for contact lenses**

  Inventor(s): Nozaki; Zenkichi (Ageo, JP)

  Assignee(s): Asahi Irika Co., Ltd. (Saitama, JP)

  Patent Number: 4,973,827

  Date filed: September 29, 1989

  Abstract: A disinfector unit for contact lenses making use of a commercial power source, which can be used corresponding to commercial power source outlets of standards varying with countries and districts, i.e., various types of outlets operable at varying voltages, includes a heater element for receiving a power of varying voltages to heat a contact lens held in a lens case placed in a lens case holder to a predetermined temperature, an electrical controller therefor and a plurality of plugs, each including a case body provided in its one side with a cavity and an electric conductor from which varying types of inserts extend. The plug having the inserts coinciding with an outlet of commercial power used is selected and fitted in the cavity in the case body, and the extending inserts are plugged into the outlet to supply current for predetermined disinfection.

  Excerpt(s): The present invention relates to a disinfector unit which is used for disinfecting bacterial microorganisms sticking to contact lenses by boiling, and designed to use commercial power as a power source and, more particularly, to a disinfector unit

which is usable in various countries where varying voltages and varying types of outlets are prescribed to be applied.... Because of their liability to bacterial deposition, soft types of contact lenses are disinfected in a liquid preservative by boiling for each wearing, and this is generally achieved with disinfector units making use of commercial power for domestic purposes, since daily care is needed under such conditions as defined in terms of a temperature of 80.degree. C. and a time length of 10 minutes or longer (see, e.g., U.S. Pat. Nos. 4,044,266, 4,158,126, 4,178,499 and 4,235,842).... Other disinfector units known in the art are miniaturized by the application of PTC heater elements or integrated circuits (or ICs for short) and designed to dispense with any cord and include a plug in a case as an integral piece for making easy storage and handling such as in carrying in travels (see Japanese Patent Laid-Open No. 61-244362 filed on Apr. 22, 1985).

Web site: http://www.delphion.com/details?pn=US04973827__

- **Disposable apparatus for containing and cleaning contact lenses**

  Inventor(s): Luttrell; Mark (161 N. Rose Rd., Memphis, TN 38119)

  Assignee(s): none reported

  Patent Number: 5,853,085

  Date filed: November 4, 1997

  Abstract: A hermetically sealable envelope having an open end for containing one or more contact lenses. The envelope is divided into one or more lens containing compartments and one or more fluid containing compartments. One or more ports are formed by the envelope to facilitate communication between each of the one or more fluid containing compartments and selected one or more of the lens containing compartments. One or more flexible balloons, having a quantity of lens care solution contained therein, are encased within the one or more fluid containing compartments. The contact lenses to be cleaned are placed in selected ones of the contact lens containing compartments which are thereafter hermetically sealed by closing a tongue and groove closure defining an upper end of the flexible envelope. After sealing the contact lenses within the envelope, manual pressure is exerted against the selected ones of the one or more balloons to burst the selected balloons and thereby dispense the lens care solution contained therein through the ports and within the lens containing compartments to treat and clean the contact lenses contained therein.

  Excerpt(s): The present invention relates to apparatus for containing contact lenses in a liquid lens care solution. More particularly, the present invention relates to flexible, disposable and transparent apparatus for containing contact lenses in a liquid lens care solution wherein the liquid lens care solution is permanently contained in the apparatus for a one time use. In even greater particularity, the present invention relates to such containing apparatus wherein the contact lenses are contained in compartments separate from the liquid lens care solution, such that the liquid lens care solution is selectively injected into the compartment after the contact lenses are received and hermetically isolated therein.... It is commonly known that optical contact lenses must be periodically cleaned and moisturized to facilitate optimum performance when applied to the human cornea. A variety of cleaning and moisturizing solutions are also known. Commonly each contact lens is placed in a separate rigid container wherein a volume of lens care solution has been deposited from a larger separate container of lens care solution. A need exists, however, for a easily portable and disposable lens care apparatus for use by persons who are traveling. When traveling, it can be overly cumbersome to carry the larger volume of lens care solutions and separate lens

containers. Also, unexpected overnight stays may leave a contact lens user without solution or containers for caring for his or her contact lenses. This dilemma requires the user to purchase an additional large quantity of cleaning solution and additional containers.... What is needed is a disposable contact lens container having a quantity of lens care solution therein which is maintained in a sterile environment. U.S. Pat. No. 5,054,610 issued to Ajello on Oct. 8, 1991, discloses a disposable single use contact lens conditioning package having a plurality of shallow trays which contain a small quantity of lens care solutions therein. The solution is contained in the trays by a polyurethane film adhesively connect to the trays. To use the lens conditioning package described in U.S. Pat. No. 5,054,610, the film is pulled from the tray and the lenses are placed in the solution for overnight conditioning. Though simple and efficient in its use, the lens conditioning package described in U.S. Pat. No. 5,054,610 requires some dexterity by the user for proper use. The removal of the film from the tray, placement of the contact lenses within the tray and stirring of the contact conditioning solution with the spoon provided can result in inadvertent spillage of the solution and accidental loss of the contact lenses.

Web site: http://www.delphion.com/details?pn=US05853085__

- **Disposable, hydrogel soft contact lenses**

  Inventor(s): Steckler; Robert (Mission Viejo, CA)

  Assignee(s): Plastomedical Sciences, Inc. (Briarcliff Manor, NY)

  Patent Number: 4,426,492

  Date filed: September 3, 1981

  Abstract: Stable three dimensional hydrogels which absorb water, but are insoluble in water, and are particularly useful for the making of soft contact lenses, are prepared by reacting a water insoluble polyvinyl resin which contains reactive hydroxyl groups in its polymer chain, with a di- or poly-basic acid anhydride, to thereby introduce pendant carboxyl groups into the polymer chain, followed by treatment of the thus obtained carboxylated polymer to effect a limited amount of crosslinking thereof whereby a sparingly crosslinked hydrophilic polymer is obtained which when immersed in water absorbs water and swells to form a hydrogel, which does not dissolve in water.

  Excerpt(s): This invention relates to sparingly crosslinked hydrophilic polymers having a stable three dimensioned polymer net-work, which swell when immersed in water, but will not dissolve in water, and which hereafter are referred to as "Hydrogels." Such Hydrogels have found widespread commercial applications in such areas as controlled release pharmaceuticals, herbicides, insecticides, etc. in industrial applications such as battery separators; and especially in "Softlenses," soft contact lenses for the correction of vision, or the treatment of eye diseases.... Presently available soft contact lenses are relatively fragile and subject to damage. They scratch easily. Their tear resistance is low, and there is a danger of damaging or tearing the lenses when inserting or removing them from the eye. They must be sterilized frequently and regularly (preferrably daily) to remove bacteria deposits. The eventually tend to become cloudy to varying degrees, due to protein deposits; this can greatly affect clarity and vision. Ideally, Softlenses should be discarded after a few months of use, before evidence of deterioration becomes readily noticeable. Unfortunately, their high cost, e.g. $150.00 or more for a pair, discourages the user from discarding the lenses, until deterioration has become rather far advanced. This can lead to eye injury or damage, including serious eye diseases, due to bacteria, protein deposits, impurities, etc.... Conventional Softlenses are based on

HEMA (Hydroxyethyl methacrylate)/polymers, e.g. U.S. Pat. No. 3,503,942 of Mar. 31, 1970 to M. Seiderman, or HEMA-Vinyl Pyrrolidone copolymers, e.g. my U.S. Pat. No. 3,532,679 of Oct. 6, 1979 to R. Steckler;/or similar hydrophilic polymeric compositions, polymerized under closely controlled conditions to form rods or pellets from which lenses are ground and polished to optical specifications. In the case of monomer blends which can be cast in molds, semi-finished or completed lens shapes can be obtained. All these processes are slow, tedious and account for the high cost of Softlenses.

Web site: http://www.delphion.com/details?pn=US04426492__

- **Double redox system for disinfecting contact lenses**

  Inventor(s): Schlitzer; Ronald L. (Fort Worth, TX), Dassanayake; N. L. (Arlington, TX), Bhatia; Rajkumar P. (Arlington, TX)

  Assignee(s): Alcon Laboratories, Inc. (Fort Worth, TX)

  Patent Number: 5,591,397

  Date filed: June 7, 1995

  Abstract: An improved method for rapid disinfection of contact lenses in a convenient and reliable manner is disclosed in which a series of oxidation-reduction reactions are employed. Specifically, dichloroisocyanurate and potassium iodide react to form iodine species for disinfecting the contact lens. An amount of ascorbate is then added to neutralize the iodine species.

  Excerpt(s): The present invention relates to an improved system for disinfecting human worn contact lenses. More particularly, this invention relates to a composition and method for disinfecting contact lenses wherein a sequence of oxidation-reduction reactions are employed to provide very potent and rapid disinfection capability.... Conn et al., "Iodine Disinfection of Hydrophilic Contact Lenses," Annals of Ophthalmology, pages 361-364 (March 1981).... Many of these prior systems have had significant drawbacks such as inadequate disinfection, inconvenience, and discoloration of contact lenses. There has, therefore, been a continuing need for a disinfection system which is capable of achieving very rapid disinfection of contact lenses in a convenient and reliable manner. The present invention is directed to the provision of an improved system which satisfies this need.

  Web site: http://www.delphion.com/details?pn=US05591397__

- **Dual neutralization system for iodine treatment of contact lenses**

  Inventor(s): Rogalskyj; Jill S. (Livonia, NY), Heiler; David J. (Avon, NY), Dobie; Alyce K. (Williamson, NY)

  Assignee(s): Bausch & Lomb Incorporated (Rochester, NY)

  Patent Number: 5,925,317

  Date filed: December 6, 1996

  Abstract: A method and system for disinfecting contact lenses with iodine using a neutralizing solution having a first, rapid neutralizing component which completes its reaction with available iodine in less than five seconds and a second, slower neutralizing component which completes its reaction with available iodine in about 3 to 30 minutes.

Excerpt(s): This invention relates to the field of contact lens treatment, and more particularly relates to contact lens disinfection, and especially relates to the neutralization of iodine disinfectants used to treat contact lenses. In some aspects, this invention further relates to the simultaneous cleaning and disinfection of contact lenses using iodine as the active disinfectant.... Iodine is a well-known disinfecting agent known to be useful against a variety of organisms, including viruses, bacteria, spores, yeast, molds, protozoa, fungi, worms, nematodes and the like. Because of the wide range of disinfecting capabilities, iodine has been suggested for use as a contact lens disinfectant. However, iodine is a strong irritant at higher concentrations and may, when used in concentration required for disinfection, destroy animal proteins and otherwise be harmful. Therefore, because of the potential harm to the eye, iodine is preferably neutralized before the disinfected lens is inserted in the eye.... Methods disclosing the neutralization of iodine as a contact lens disinfectant are known. See U.S. Pat. Nos. 3,911,107 and 4,031,209 to Krezanoski. Both patents disclose neutralizing the iodine in solution by slow dissipation methods and use compounds suitable for human and animal use. The neutralizing solution favored by Krezanoski contains sorbic acid and EDTA.

Web site: http://www.delphion.com/details?pn=US05925317__

- **Electrolytic sterilizer for contact lenses**

  Inventor(s): Yamauchi; Masakatu (Kani, JP)

  Assignee(s): Tanica Electric Co., Ltd. (Tajimi, JP), Tomei Sangyo Kabushiki Kaisha (Nagoya, JP)

  Patent Number: 4,512,865

  Date filed: June 6, 1984

  Abstract: An electrolytic sterilizer for contact lenses comprising a main body accommodating a power source unit and a sterilizing container detachably mountable on the main body and having electrodes electrically connectable, through container-side contacts and main body-side contacts, to said power source for electrolysis, wherein the main body has a groove for a waste solution, and the main body-side contacts are located outside of the groove.

  Excerpt(s): The present invention relates to an electrolytic sterilizer for contact lenses comprising a main body accommodating a power source unit and a sterilizing container detachably mountable on the main body. More particularly, the present invention relates to a specific structure for the electrode connection in such an electrolytic sterilizer.... Conventional hydrated contact lenses composed principally of a hydrophilic monomer such as 2-hydroxyethyl methacrylate normally contain more than about 30% by weight of water. As a result, the hydrated contact lenses are likely to provide by themselves a favorable environment for the multiplication of various detrimental bacteria. Furthermore, it is very dangerous to wear bacteria-infected contact lenses on the eyes without treating them in any way, since this practice may lead to serious damage to the eye tissue. For this reason, it is essential to sterilize such hydrated contact lenses periodically.... (1) The protein and other components in tears deposited on the lens undergo a thermal metamorphosis due to the boiling operation and stick to the lens surface, thereby impairing the optical properties of the lens and remarkably reducing the comfortableness of wearing the lens on the eye.

  Web site: http://www.delphion.com/details?pn=US04512865__

- **Enclosure for hard and soft contact lenses**

  Inventor(s): Sherman; Guy J. (Sarasota, FL)

  Assignee(s): Milton Roy Company (St. Petersburg, FL)

  Patent Number: 3,997,049

  Date filed: September 4, 1975

  Abstract: An improved container for storing and conditioning both hard and soft contact lenses. A pair of lens-retaining baskets are pivotally mounted within the cap of a fluid-tight container. With the cap removed and inverted, the baskets may be folded outwardly to allow unimpaired access to the lenses therein. The basket lids open in a common direction, providing immediate identification of right and left lens baskets.

  Excerpt(s): The present invention relates to containers for contact lenses, and more particularly to containers for facilitating the soaking, asepticizing and rinsing of lenses of both the hard and soft types.... With the advent of contact lenses, there arose a need for compact, economical enclosures in which to store and condition the lenses. In the case of the so-called "hard" contact lens, it was necessary to provide a fluid-holding container into which the lenses could be placed and submerged. The immersion fluid serves several purposes, acting as a cleaner and an asepticizing agent for preventing the growth of undesirable organisms on the lens surface.... With the newer "soft" lenses, a somewhat different regimen is required. The so-called "soft" lenses are of porous nature, and must be hydrated in order to maintain their pliable quality. In addition, however, the porous nature of the lens material makes the lenses more susceptible to the harboring of micro-organisms. Thus, sterilization of the lenses is even more critical than with hard lenses. Typically soft lenses are kept immersed in a saline solution and asepticized by heating. In particular, the lenses are usually either steamed or boiled in the saline solution.

  Web site: http://www.delphion.com/details?pn=US03997049__

- **Flat case for disinfecting contact lenses**

  Inventor(s): Bourset; Claude (Creteil, FR)

  Assignee(s): Essilor International Compagnie Generale d'Optique (Charenton Cedex, FR)

  Patent Number: 6,086,823

  Date filed: April 22, 1998

  Abstract: The flat case comprises a case body (1) comprising at least one wall (2) defining a disinfecting chamber (10) open at one end and intended to take a lens (50) to be disinfected, at least one removable cap (20) intended to be fixed on the open end of the chamber, at least one catalytic element secured to the cap (20) capable of being immersed in the disinfecting solution (10) and comprising a catalyst support and a catalyst (34) and at least one protective element (30) secured to the cap (20) having an end wall (32) provided with passages (33) for the disinfecting solution, forming a barrier between the lens (50) and the catalytic element, and at the same time holding the lens securely.The invention has application to the disinfecting of contact lenses.

Excerpt(s): The present invention relates in general to a flat case for disinfecting contact lenses and more specifically to a flat case of this kind in which the contact lenses are disinfected using a disinfecting solution, for example an oxidizing solution based on hydrogen peroxide and in which the disinfecting of the contact lenses and the neutralizing of the disinfecting solution take place simultaneously.... For disinfecting contact lenses, it is known for the contact lenses to be immersed in an oxidizing disinfecting solution based on hydrogen peroxide.... It goes without saying that it is extremely dangerous to insert into one's eye a contact lens which has just been taken out of a disinfecting hydrogen peroxide solution, for such a disinfecting solution is highly irritating to the eye. The disinfecting solution therefore needs to be neutralized before the contact lenses can be re-used. This neutralizing step is carried out conveniently by bringing a catalyst for breaking down the hydrogen peroxide into contact with the hydrogen peroxide solution.

Web site: http://www.delphion.com/details?pn=US06086823__

- **Fluorine and/or silicone containing poly(alkylene-oxide)-block copolymers and contact lenses thereof**

  Inventor(s): Mueller; Karl F. (New York, NY), Plankl; Walter L. (Yorktown Heights, NY)

  Assignee(s): Ciba-Geigy Corporation (Ardsley, NY)

  Patent Number: 5,115,056

  Date filed: February 28, 1990

  Abstract: Fluorine and/or silicone containing block copolymers are described which are the copolymerization product of mono; di- or trivinyl substituted poly(alkylene oxide) prepolymers (A) and fluoroalkyl-alkylene acrylates or methacrylates (B1), oligosiloxy-silyl alkyl-acrylates or methacrylates (B2), and optionally other copolymerizable comonomers (C). The novel block copolymers are prepared in solution or bulk and are characterized by high oxygen permeability, flexibility and wettability and are therefore well suited as biocompatible polymers, especially as contact lenses.

  Excerpt(s): Two classes of contact lenses can be distinguished by the way they are fitted to the eye. In hard lenses the fit is flatter than the cornea itself and the lens rocks back and forth with each eye lid blink, pumping tear fluid and thereby oxygen, as well as cell debris under and from under the lens. Hard lenses are preferred whenever excellent visual acuity is desired and difficult vision corrections are required, for instance in the case of astigmatism. They as however less comfortable for the wearer than are soft lenses, the second class of contact lenses. Soft contact lenses derive their name from their low modulus and draping quality, which allows them to smoothly cover the cornea surface. They are fitted to match the cornea as closely as possible and they are not disturbed much by the eyelid. Because of their tight adherence to the cornea, they have to possess sufficient oxygen permeability to keep the cornea well supplied with oxygen.... In the most common soft lens material -.about.40% water containing poly-(2-hydroxyethyl methacrylate) or poly-HEMA - water provides for sufficient oxygen flux to allow poly-HEMA lenses to be worn on a daily basis. The oxygen permeability O.sub.2.DK of a poly-HEMA hydrogel with.about.40% water is 6.5 barrers, and for hydrogels with higher water content, for example poly-(N-vinylpyrrolidone) or poly-(vinyl alcohol) copolymers it is.about.12.5 at 50% water, 15.5 at 60% water and 25 at 70% water. Such higher water-content hydrogels allow therefore the manufacture of soft contact lenses for extended wear, up to several months, subject only to periodic cleaning. Unfortunately, high water content hydrogels are also very fragile. especially if

they are cut very thin, as they often are in order to increase oxygen flux.... Another class of soft contact lens materials are polysiloxane rubbers (PDMSi), which can have O.sub.2.DK values up to 500 barrers. Several polysiloxane based soft contact lens materials have been described, among them: conventional PDMSi rubbers produced by a hydrosilation cure; PDMSi-polyurethanes and PDMSi-polyacrylate block copolymers. All of these materials suffer from an inherent lack of wettability and therefore require some kind of surface treatment to achieve the wettability required for comfortable and safe in-eye wear.

Web site: http://www.delphion.com/details?pn=US05115056__

- **Fluorocarbon-sulfone hydrophilic contact lenses, optical medical devices and compositions thereof**

  Inventor(s): Novicky; Nick (#20, 1410-4oth Ave., NE, Calgary, Alberta, CA T2E 6L1)

  Assignee(s): none reported

  Patent Number: 6,559,198

  Date filed: July 5, 2001

  Abstract: Highly comfortable hydrophilic contact lenses are made from a coploymer of an ethylenically unsaturated fluoro-sulfone ester, ethylenically unsaturated fluorosulfone ester monomer of acrylic or methacrylic acid having alkyl hydroxy group and N-Vinyl 2-pyrrolidinone and methods for the manufacturing thereof.

  Excerpt(s): The present invention relates to novel formulation of monomers, to produce polymers for the purpose of manufacturing hydrophilic contact lenses and other optical devices, including optical medical devices. In particular, one important use of the materials made from the invention is the manufacture of corneal contact lenses.... In recent years, hydrophilic corneal contact lenses have become more and more popular in the United States, Canada and throughout the world. In an attempt to create contact lenses which are comfortable and oxygen permeable and essentially clean from deposits it requires incorporation of a longer fluorocarbon chain component in order to make the surface of the lens slick, permitting easy movement on the eye without any friction, and wettable to accomplish necessary comfort for the patient.... Previous hydrophilic contact lenses are based on 2-hydroxyethyl methacrylate (HEMA) or derivatives thereof which produce reasonable comfort to the patient while they are clean; however, when worn for a longer period of time they have a tendency to accumulate deposits or debris on the surface of the lens and then require constant cleaning or in other cases become disposable, that patient has to dispose of contact lenses and get new ones.

  Web site: http://www.delphion.com/details?pn=US06559198__

- **Handling device for soft contact lenses**

  Inventor(s): List; Frederick B. (1312 Main St., Lubbock, TX 79400)

  Assignee(s): none reported

  Patent Number: 4,126,345

  Date filed: December 27, 1977

  Abstract: A device for handling soft contact lenses comprises a pair of resilient pincer arms, each arm having one end mutually interconnected and a free end spaced apart

from the other free end. A lens cup is attached to the interconnected arm ends and is shaped for receiving and holding a sfot contact lens therein. The free end of each pincer arm includes a soft tip connected therewith, which extends outwardly therefrom, is constructed of a resilient, flexible material, and has a terminal surface shaped for frictionally engaging an outer surface of a soft contact lens. The arms are interconnected for positioning the tips on opposing sides of the lens when the soft contact lens is positioned in the eye of a wearer, whereby convergence of the arms folds the lens between the tips for removal of the lens from the eye.

Excerpt(s): This invention relates to a handling device for contact lenses, and in particular to a device for inserting and removing soft contact lenses.... Various devices have been designed for aiding contact lens wearers in inserting and removing contact lenses from the eye. Structures such as those disclosed in U.S. Pat. Nos. 3,584,908 and 3,934,914 include a suction bulb arrangement for holding the lens in contact with the handler, and are specifically designed to handle "hard" or "contactless" contact lenses, and are not adapted for the use with the recently developed soft contact lenses. A soft contact lens is constructed of a hydrophilic material, which when hydrated, is extremely pliable and requires special asepticizing, cleaning, storage, removal, and insertion techniques. As an example of the unusual characteristics demonstrated by the soft contact lenses, the same must be folded to remove it from the wearer's eye, and must be thoroughly asepticized, preferably by specially designed equipment. Because of the above noted features of the soft contact lenses, handling of the same by the user's fingers often results in injury and/or insult to both the eye and to the lens from fingernails, rough hands, and the like. Also, oil, dirt, and other foreign matter on the user's hands can easily damage the lens and/or cause injury to the eye. The present device is particularly designed for safely handling soft contact lenses.... The principal objects of the present invention are: to provide a device for safely inserting and removing soft contact lenses from a human eye; to provide such a device having pincer arms with soft, pliable tips projecting from each arm free end for removing a soft contact lens from a wearer's eye without causing injury or insult thereto; to provide such a device having a lens cup connected with the other end of the device for inserting the lens into the eye; to provide such a device wherein the cup is disposed at an obtuse, anatomical angle to the pincer arms for easy insertion of the lens into the eye; to provide such a device having an imperforate cover member encasing a major portion of the device for thorough sanitation thereof and clean lens handling; to provide such a device having flexible, tubular tips for non-injurious lens contact and improved user comfort; to provide such a device having a deformable lens cup to facilitate lens insertion; and to provide such a device which is economical to manufacture, efficient use, capable of a long operating life, and particularly well adapted for the proposed use.

Web site: http://www.delphion.com/details?pn=US04126345__

- **High toughness synthetic high polymers for soft contact lenses and a process for manufacturing the same**

  Inventor(s): Tanaka; Kyoichi (Nagoya, JA)

  Assignee(s): Toyo Contact Lens Company, Limited (Nagoya, JA)

  Patent Number: 3,992,563

  Date filed: March 17, 1975

  Abstract: A process for manufacturing high toughness synthetic high polymers for soft contact lenses comprising the steps of: preparing a five-component solution by adding

to a predominant two-components solution of a 2-hydroxyethyl methacrylate monomer and n-amyl methacrylate monomer a vinyl propionate monomer and a vinyl acetate monomer as auxiliary components with further addition of an initiator for polymerization, followed by mixing to provide an intimate mixture or solution; injecting the solution into a mold; preferably closing the mold during heating and co-polymerizing of the solution in the mold; and cooling the product, followed by removal thereof from the mold. A synthetic high polymer manufactured according to the process of this invention is high in hydrophilicity, optical performance and machinability, which fulfills the requirements for manufacturing conventional soft contact lens. In addition the synthetic high polymer exhibits tenacious elasticity and, when hydrated and swollen, has no tendency to break or crack, thus being highly suitable as the material for soft contact lens with high durability. Moreover, the synthetic high polymer of this invention can be used for the manufacture of artificial corneas and optical lenses for medical use, and also, when dyed, for the manufacture of artificial eyes and iris contact lenses.

Excerpt(s): This invention relates to synthetic high polymers for soft contact lenses and a process for manufacturing them.... Conventionally used materials for soft contact lenses mainly include homopolymers or copolymers of OH-bearing acrylic derivatives, copolymers of an OH-bearing acrylic derivative and vinylpyrrolidone and vinylpyrrolidone homopolymers. The soft contact lenses made of these materials are satisfactory in optical performance as lenses and due to swelling upon hydration, are not painful in use. In addition, good machinability of these materials permits the manufacture of a precisely shaped thin contact lens. Although having excellent properties as set forth above, the soft contact lenses made of conventional materials have still suffered from the drawback of having a tendency to break or crack while handling them, because they are brittle and of low mechanical strength. This drawback becomes more marked when they are swollen with water. They are broken very often in handling during placement in contact with, or removal from contact with, the eyeballs. Since a contact lens is handled as a lens and directly fits on the eye it is necessary to sterilize it such as by treatment in boiling water, followed by removing deposits on the surface of the lens by rubbing the lens surface directly with a soft sponge or a finger tip. In such cleaning and sterilizing operations the soft contact lenses made of the above described conventional materials show a tendency to break or crack, and are therefore not suitable for prolonged use.... It is, therefore, an object of this invention to provide a synthetic high polymer for soft contact lenses having a novel composition wherein the above mentioned drawbacks of the contact lenses known in the art are eliminated, and to provide a process for manufacturing such synthetic high polymers.

Web site: http://www.delphion.com/details?pn=US03992563__

- **Hydrogel contact lenses for permanent wear**

  Inventor(s): Atkinson; Ivor B. (Surbiton, GB2), Holdstock; Barry C. (Surbiton, GB2)

  Assignee(s): CooperVision, Inc. (Menlo Park, CA)

  Patent Number: 4,492,776

  Date filed: April 12, 1984

  Abstract: A process is disclosed for the preparation of hydrogel contact lenses having improved mechanical properties, said process comprising polymerizing, in the presence of an azo type initiator, a monomer mixture comprising from 25% to 50% by weight of N-vinyl pyrrolidone, up to 5% by weight of methacrylic or acrylic acid, 0.1 to 1% by

weight of 1,3,5-tris(propenoxy)-2,4,6-triazine (TPT), or perhydro-2,4,6,-triketo-1,3,5,-tris (propene-2)-1,3,5-triazine (T.T.P.T.), as a cross-linking monomer, the balance being essentially hydroxy alkyl acrylate or methacrylate, wherein the alkyl group is ethyl or propyl.

Excerpt(s): This invention relates to contact lenses of the kind which are polymer hydrogels containing a major proportion of water.... Polymer hydrogels are widely used for contact lenses and a large number of soft contact lenses of this type are based on the polymers described in U.S. Pat. No. 3,220,960 (Wichterle). Wichterle's polymers are hydroxy (lower alkyl) methacrylates or acrylates, cross-linked with a small percentage of the corresponding diester e.g. ethylene glycol dimethacrylate (EGDM). Polymers based upon hydroxy ethyl methacrylate (HEMA) and cross-linked with EGDM can be hydrated to form clear hydrogels having good mechanical properties. Unfortunately the oxygen permeability of such lenses (which is directly related to the retained water content) is generally insufficient to allow the lenses to be worn continuously. Consequently, although soft lenses are usually more comfortable than hard lenses, most commercial soft lenses have to be removed at night in order to avoid the development of anoxic edema arising from insufficient corneal respiration.... One important exception is the soft lens marketed under the Registered Trade Mark "Permalens" by Coopervision (U.K.) Limited and described in British Pat. Nos. 1,475,605 and 1,385,677. While such soft contact lenses have been commercially successful there has been a continuing need to further improve the mechanical properties of the hydrogels, especially in relation to resistance to tear initiation and "toughness". In this specification the "toughness" of a hydrogel means the area between the stress-strain curve of the hydrogel and the strain axis. Tear initiation strength and toughness have been found from experience to be predictors of durability of a hydrogel considered for use as a contact lens material.

Web site: http://www.delphion.com/details?pn=US04492776__

- **Hydrogen peroxide disinfecting system for contact lenses**

  Inventor(s): Andermann; Guy (Strasbourg, FR), Spittler; Joseph (Kayersberg, FR), Zilliox; Patricia (Strasbourg, FR), Mergel; Dominique (Sigolsheim, FR)

  Assignee(s): Laboratoires, P.O.S. (Kayserberg, FR)

  Patent Number: 4,880,601

  Date filed: September 27, 1985

  Abstract: A system and method for disinfecting contact lenses with a stabilized hydrogen peroxide solution and a separate neutralizing solution are described. Sodium stannate (a.k.a. sodium tin oxide) is utilized to stabilize the hydrogen peroxide, and sodium thiosulfate is utilized to neutralize the hydrogen peroxide. In addition to sodium thiosulfate, the neutralizing solution also contains a complexing agent capable of sequestering tin, such as EDTA or EGTA. The system and method provide improvements over prior hydrogen peroxide disinfection systems with respect to stability, predictability and rate of reaction.

  Excerpt(s): The present invention relates to a system or kit for disinfecting contact lenses, and to a method of disinfecting contact lenses utilizing that kit or system. More particularly, this invention relates to a two part, hydrogen peroxide based system for disinfecting contact lenses.... Hydrogen peroxide is becoming recognized as a safe and efficacious disinfectant for contact lenses. In this regard there is unaminity between the clinicians responsible for designating such systems and the users of such products. This

acceptance is primarily attributable to the fact that such systems are substantially predictable in their intended use, taking into consideration the wide range of individuals who rely upon the disinfecting effect and the good and bad habits of those individuals. However, after disinfecting, residual hydrogen peroxide must be removed before again wearing the lens. This is because hydrogen peroxide, even in trace amounts, can cause corneal irritation in sensitive individuals. It is in this respect that prior art systems fail, or introduce complications resulting in user errors, elevated costs, and unpredictability. For example, repeated rinsing to remove residual hydrogen peroxide in isotonic, buffered saline solution is effective only if repeated extractions over a longer period are made. The resulting inconvenience motivates the user to take short cuts or otherwise deviate from recommended procedure with attendant risk of imperfect removal of residual hydrogen peroxide or introduction of microorganisms. Other systems rely on enzymatic or inorganic catalysis to decompose residual hydrogen peroxide. Such systems are, when looking at the average user, problematic and slow.... The following publications provide further background concerning the use of hydrogen peroxide to disinfect contact lenses: Gasset et al., "Hydrogen Peroxide Sterilization of Hydrophilic Contact Lenses," Archives of Ophthalmology, Vol. 93, pages 412-415 (1975); U.S. Pat. No. 3,912,451 issued to Gaglia; and U.S. Pat. No. 4,521,375 issued to Houlsby. These publications relate to three different means for solving the same problem; namely, how to effectively neutralize the hydrogen peroxide which remains in and on a contact lens after treatment with that compound. The solutions discussed in these publications are based on the use of sodium thiosulfate (Gasset et al.), a platinum catalyst (Gaglia), and sodium pyruvate (Houlsby) to neutralize hydrogen peroxide. These systems also suffer from various problems, such as instability, unpredictability and slowness.

Web site: http://www.delphion.com/details?pn=US04880601__

- **Hydrophilic colored contact lenses**

  Inventor(s): Narducy; Kenneth W. (Cupertino, CA), Jahnke; Richard L. (Villa Park, IL), Loshaek; Samuel (Chicago, IL)

  Assignee(s): Schering Corporation (Kenilworth, NJ)

  Patent Number: 4,857,072

  Date filed: November 24, 1987

  Abstract: There is disclosed a method for making colored hydrophilic contact lenses. A contact lens constructed of hydrophilic polymer that is substantially devoid of the functional groups --COOH, --OH, --NH--R, wherein R is hydrogen or C.sub.1 to C.sub.8 alkyl, --NCO and epoxy is provided. At least a portion of the surface of the lens is coated with a color coat comprising at least one pigment, binding polymer having functional groups selected from at least one of --COOH, --OH, and --NH--R, wherein R is hydrogen or C.sub.1 to C.sub.8 alkyl, and an additional compound having at least two groups per molecule of --NCO. The coated lens is subjected to conditions which cause the color coat to adhere to the lens.

  Excerpt(s): The present invention relates to hydrophilic colored contact lenses.... U.S. Pat. No. 4,668,240 (Loshaek) discloses colored contact lenses produced with a lens polymer that must, in its preferred embodiments, contain one or more of the functional groups --COOH, --OH, or --NH--R, wherein R is hydrogen or C.sub.1 to C.sub.8 alkyl. At least a portion of the surface of the lens is coated with a color coat comprising at least one pigment, binding polymer having, in the preferred embodiment, the same functional groups, and an additional compound having at least two groups per

molecule selected from at least one of --NCO and epoxy. The lens and binding polymers are then bound to each other by the reaction of the groups --COOH, --OH, or --NH--R in the lens and binding polymers with the groups --NCO or epoxy. In another embodiment of the Loshaek patent, the lens polymer contains one or more of the functional groups --NCO or epoxy and the binding polymer contains one or more of the functional groups --COOH, --OH, or --NH--R. The lens and binding polymer are bound to each other by reaction of the functional groups.... However, some hydrophilic contact lenses do not contain one or more of the functional groups --COOH, --OH, --NH--R, --NCO, or epoxy. Typical of such lenses are those disclosed in U.S. Pat. Nos. 4,158,089 (June 12, 1979) and 4,182,802 (Jan. 8, 1980). The lenses disclosed in the latter patents are produced by polymerizing hydrophilic monomers (typically N-vinyl pyrrolidone) and hydrophobic monomers (typically alkyl esters of acrylic or methacrylic acid or styrene). The result is a hydrophilic lens that does not contain the functional groups --COOH, --OH, --NH--R, --NCO, or epoxy.

Web site: http://www.delphion.com/details?pn=US04857072__

- **Hydrophilic contact lenses and lens polymer**

  Inventor(s): Holcombe, Jr. Frank O. (Beltsville, MD)

  Assignee(s): Burton, Parsons and Company, Inc. (Washington, DC)

  Patent Number: 4,113,686

  Date filed: June 9, 1977

  Abstract: A superior hydrophilic gel polymer and contact lenses therefrom are formed by bulk polymerization of about 100 parts by volume of hydroxyethyl methacrylate, 10 parts by volume of isobutyl methacrylate, 0.136 parts by volume of trimethylolpropane trimethacrylate, 1.35 parts by volume of methacrylic acid in the presence of 0.25 parts by volume of 2,5 dimethyl 2,5 bis (2-ethyl hexoyl peroxy) hexane at a temperature of about 65.degree. C to produce a material which, when hydrated, exhibits a water content of about 43% and a linear expansion of about 22%.

  Excerpt(s): This application relates to hydrophilic gel polymers and hydrophilic gel polymer lenses. More particularly, it relates to contact lenses of the so-called "soft" type. Still more particularly, it relates to hydrophilic gel polymer contact lenses having improved physical and mechanical properties. More particularly yet, the present invention relates to a novel hydrophilic gel polymer having exceptional physical and mechanical properties offering substantial advantages in the manufacture of contact lenses and to hydrophilic gel polymer contact lenses formed therefrom having superior physical and mechanical properties.... Hydrophilic gel polymers and contact lenses of such polymers are now well known in the art and are finding ever wider use and acceptance. Such polymers and their employment are taught, for example, in U.S. Pat. No. 2,976,576 and in U.S. Pat. No. Re. 27,401. The polymers therein disclosed and claimed are cross-linked, three dimensional gel latices resulting from the addition polymerization, normally, of hydroxyethyl methacrylate and a minor amount of ethylene glycol dimethacrylate. The polymers thus formed are hydrophilic and are swelled by, but insoluble, in water. When fully hydrated, depending upon the degree of cross-linking, they contain 20 to 97 weight percent water, and swell to an extent which is a variable of the water content. When hydrated, the polymer is soft, pliable, and optically clear and, normally, colorless.... Because of the combination of properties of such hydrated gel polymers, they have been found useful in the manufacture of contact lenses and offer characteristics not before obtainable.

Web site: http://www.delphion.com/details?pn=US04113686__

- **Hydrophilic polymers and contact lenses made therefrom**

  Inventor(s): Lim; Drahoslav (San Diego, CA), Kulkarni; Chidambar L. (San Diego, CA), Repella; Dennis A. (San Diego, CA)

  Assignee(s): Barnes-Hind, Inc. (Sunnyvale, CA)

  Patent Number: 4,536,554

  Date filed: February 22, 1984

  Abstract: An interpenetrating network polymer is obtained by mixing hydrophilic monomer vinyl pyrrolidone and hydrophobic monomer (5-alkylene-m-dioxanyl) acrylic ester in the presence of at least two crosslinking agents and, optionally, hydroxyalkyl acrylic ester and catalysts and causing polymerization to occur. Contact lenses made from the polymer have high tensile strength and can absorb a high degree of water.

  Excerpt(s): This invention relates to transparent optically clear interpenetrating network polymers suitable for manufacturing contact lenses, and particularly to such polymers that have been prepared with modifiers and crosslinking agents, and the method of preparation of the modified, crosslinked, optically transparent interpenetrating network polymers.... It is known that certain hydrophilic gel contact lenses of high water content have oxygen permeability which are order of magnitude greater than conventional polymethylmethacrylate lenses and provide sufficient amounts to cornea for its metabolic needs. The increased oxygen permeability makes possible increased wearing time with increased comfort and absence of most of the undesirable physiological symptoms resulting from the conventional lens wearing.... In order to optimize the foregoing advantages of these hydrophilic lenses, materials with high water content are desired. However, previously the strength of lenses with very high water content have been found to be low in tensile strength and having tear resistance which decreases progressively with the increase in water content. Such lenses are very fragile and are not very durable. In some instances such contact lenses can only be inserted and removed by a professional practitioner because of their fragility. Such polymers are found in the following patents. Brit. Pat. Nos. 1,391,438 and 1,475,605; U.S. Pat. Nos. 3,639,524, 3,721,657, and 3,943,045.

  Web site: http://www.delphion.com/details?pn=US04536554__

- **Hydrophilic polymers and contact lenses of high water content**

  Inventor(s): Loshaek; Samuel (Chicago, IL), Shen; Chah M. (Chicago, IL)

  Assignee(s): Schering Corporation (Kenilworth, NJ)

  Patent Number: RE31,422

  Date filed: December 9, 1981

  Abstract: Cross-linked hydrophilic interpolymers and contact lenses made therefrom comprising hydrophilic units of which the only or major proportion are derived from.Iadd.vinyl pyridine or.Iaddend.an N-vinyl heterocyclic monomer, hydrophobic units derived from the group consisting of styrene and ring-substituted styrenes, and cross-linking units derived from monmers containing two or more polymerizable double bonds per monomer unit.

Excerpt(s): It is known in the ophthalmological field, that oxygen from the air must be made available to the eye in order to provide for the metabolic needs of the cornea. The placement of an oxygen impermeable contact lens over the cornea can seriously inhibit the transmission of oxygen to it and result in corneal trauma. This situation has been partially alleviated by the so-called pump design of corneal contact lenses which serves to replace the lachrymal fluid under the lens (containing carbon dioxide) with freshly oxygenated lachrymal fluid and thereby make oxygen available to the cornea. The oxygen deficiency problem has been further alleviated by limiting the length of time for which an impermeable lens can be continuously worn, ranging from about four hours to 16 hours of daytime wear depending on the individual, and no wear during sleeping hours. There is also a concomitant need for the carbon dioxide, which is produced by the corneal metabolic processes, to be carried away from the cornea.... It has been found that certain hydrophilic gel contact lenses of high water content have gas permeability orders of magnitude greater than conventional polymethylmethacrylate lenses and provide for the passage of the aforesaid gases through the lens in sufficient amounts to supply corneal metabolic needs. The term "gas permeability" as used herein refers broadly to air, oxygen and carbon dioxide permeability. It has been found, that the gas permeability increases with increasing water content of the hydrophilic polymer from which the contact lens is formed. The increased gas permeability makes possible increased wearing time with increased comfort and absence of most of the undesirable physiological symptoms produced by conventional lens wear.... In order to optimize the foregoing advantages of these hydrophilic lenses, materials with very high water content are desired. However, previously the strength of lenses with very high water contents, e.g., 60%-95% have been found to be low, the strength (resistance to tearing, puncturing, etc...) decreasing progressively with increase in water content. Such lenses are readily damaged during handling, in general are not very durable, and have poorer visual acuity. In some instances such contact lenses can only be inserted and removed by a professional practitioner because of their fragility. Further, the high water content lenses of the prior art cannot withstand repeated heat disinfection or sterilization without deterioration or destruction of the lens. Polymers of the prior art which are of sufficiently high water content to give high gas permeabilities, e.g., about 60%-95% by weight of the combined weight of polymer plus water, and especially above about 70% water content, are very weak and are readily torn or otherwise physically damaged during handling. Such polymers are exemplified in British Pat. No. 1,391,438 and U.S. Pat. Nos. 3,639,524 and 3,943,045. The polymers are prepared from monomer compositions which contain a relatively high amount of cross-linking monomer, the latter being required to prevent the hydrophilic polymer from substantially dissolving in aqueous media. This excessive cross-linking frequently results in a weak polymer.

Web site: http://www.delphion.com/details?pn=US0RE31422__

- **Hydrophilic polymers and contact lenses therefrom**

  Inventor(s): Kuzma; Petr (1708 Westminster Blvd., Parlin, NJ 08859)

  Assignee(s): none reported

  Patent Number: 4,465,794

  Date filed: February 4, 1982

  Abstract: There is prepared a hydrophilic water swellable water insoluble copolymer of (1) at least 35% of a hydroxy (C.sub.2 -C.sub.4 -alkyl)-2-alkenoate, (2) 30 to 60% of a 2-alkenamide or an N,N-di (C.sub.1 -C.sub.6 -alkyl)2-alkenamide, (3) 5 to 20% of R --

OR.sub.1).sub.x Z where R is C.sub.1 -C.sub.6 alkyl, R.sub.1 is C.sub.2 -C.sub.4 alkylene, x is an integer of 1 to 4 and Z is 2-alkenoyloxy and (4) 0.3 to 5% of a polyethylenically unsaturated crosslinking agent having a relatively long aliphatic chain, the copolymer being capable of holding 80 to 80 weight % of water. The polymers are particularly useful in preparing hydrophilic contact lenses of high burst strength and extended wear properties.

Excerpt(s): The present invention relates to novel hydrophilic copolymers and soft contact lenses made therefrom.... A hydrophilic polymer suitable for use as an extended wear soft contact lens must have high oxygen permeability and good mechanical strength.... Tolerance of a soft lens by the ocular environment is affected by water content, shape, or geometry, thickness and edge quality. The surface of the lens should be smooth in order not to affect the normal precorneal tear film and the superficial epithelial layer. Such a smooth surface should not be affected by temperature, pH, tonicity and foreign body deposition, mucous adhesion, lipids of the tears or abrasion by the lids. Wettability of the lens surface is important in order to allow tears to fill the lens-corneal interspace. The lens should also be physiologically inert.

Web site: http://www.delphion.com/details?pn=US04465794__

- **Hydrophilic-gel contact lenses adapted into a planarized xerogel state and method for making the same**

Inventor(s): Wichterle; Otto (Prague, CS)

Assignee(s): SPOFA, spojene podniky pro zdravotnickou vyrobu (Prague, CS)

Patent Number: 4,322,139

Date filed: June 15, 1979

Abstract: The invention pertains to a method of temporary planarization of hydrogel contact lenses by drying of a lens swollen in a volatile hydrophilic swelling agent and clamped in the planarized state between two surfaces, at least one of which is formed by a thin foil permeable for the hydrophilic volatile swelling agent, as long as the swelling agent diffuses through the foil and the lens is transfered into a xerogel state. According to this invention, the planarized lens may have an enlarged surface and reduced thickness in comparison with the relaxed lens and may be provided with temporary marking comprising signs or lines showing the direction of cylindric axis with toric lenses, a marginal angle scale to enable easier truncation of toric lenses, and additional specifications of the lens. The temporary marking is achieved by pressing the planarized lens during drying against a base with embosed drawing or against projections at the compression foil. According to the invention, water, C.sub.1 -C.sub.5 alcohols, formic and acetic acid, acetone, methyl ethyl ketone, and dioxan are used as the volatile swelling agents individually or in mixtures and cellophane or polyamide for permeable foils. The planarized contact lens in xerogel state may advantageously contain up to 8 wt. % of hydrophilic plasticizers, e.g. glycerol, glycolor polyglycol, to reduce the brittleness of xerogel and make easier the final adaptation of lens.

Excerpt(s): The invention pertains to a method for the adaptation of hydrophilic-gel contact lenses into a planarized xerogel state.... Three-dimensional hydrophilic gels are noted for keeping permanently their shape in the relaxed swollen state irrespective of the previous deformations. If they are transfered into a glassy state under any kind of deformation caused by external stress, they retain this deformation until they are transfered into the state of high elasticity by swelling or heating, where they again

acquire the non-deformed shape. This behavior was employed in the Czech. Pat. No. 134,722 (Brit. Pat. No. 1,174.683; U.S. Pat. No. 3,542,906; Ger. Pat. No. 1,704.530) to force contact lenses in a dry state, i.e. in the state of so called xerogel, into the planar shape, which served, according to that invention, exclusively to the easy removal of peripheral and surface defects by grinding and polishing.... The lenses were planarized, according to the aforesaid patent, by heating of a dry lens, which was usually entirely accidentally deformed by drying, to high temperature, i.e. to the temperature above the gel transformation into a highly elastic state, planarizing the lens in this state on a flat base, and temporary fixation of the lens in this deformed state for an arbitrary period of time.

Web site: http://www.delphion.com/details?pn=US04322139__

- **Hydrophilized cellulose esters, process for their preparation, their use as biomedical materials and contact lenses produced from these**

  Inventor(s): Wingler; Frank (Leverkusen, DE)

  Assignee(s): Bayer Aktiengesellschaft (Leverkusen, DE)

  Patent Number: 4,532,277

  Date filed: December 27, 1983

  Abstract: Contact lenses and implants for human medicine can be fabricated from a polymer blend comprising 98-80% by weight of component A and 2-20% by weight of component B wherein:component A is a cellulose ester of an aliphatic carboxylic acid with up to 40% by weight of total component A of an ethylene/vinyl acetate copolymer having 30-98% by weight, relative to ethylene/vinyl acetate, of incorporated vinyl acetate andcomponent B is a homopolymer or copolymer of water-soluble vinyl monomers and up to 10% by weight relative to the total polymer B of multifunctional crosslinker vinyl compounds.

  Excerpt(s): The invention relates to hydrophilized polymers based on cellulose esters of aliphatic carboxylic acids. The hydrophilization according to the invention is carried out by impregnating the cellulose esters, where appropriate in the form of blends with ethylene/vinyl acetate copolymers in the solid phase or in a melt, with water-soluble vinyl monomers, and then polymerizing the vinyl monomers under the action of heat and/or light, where appropriate with the aid of radical initiators. The invention also relates to the use of hydrophilized materials of this type as biomedical materials in human or veterinary medicine, especially in ophthalmic contact optics.... A number of different hydrophilic polymers having water-absorbing capacities of 1 to about 60% by weight has already been employed in human medicine, for example as implants or as refractive materials in contact optics. In this connection, soft gels consisting of crosslinked (meth)acrylic acid oxyalkyl ester polymers or copolymers with vinylpyrrolidone, acrylic acid, methacrylic acid, acrylamide, methacrylamide or alkylsilyl esters of methacrylic acid, amongst others, are used. However, soft gels have the disadvantage that they can accumulate metabolites, infection-inducing substances and so forth, in their lattice. This has contributed to an increased use in contact optics of, instead of these soft gels, semihard materials of cellulose acetobutyrate or blends with ethylene/vinyl acetate copolymers (EVA) as is described, for example, in European Pat. No. 0,013,366. The water-absorbing capacity of cellulose esters or their blends with EVA is about 1 to 2%, depending on the content of free OH and the wettability with water is poor. To improve the compatibility with living tissue in the human biomedical sector, an improved wettability (in other words greater hydrophilicity) would be of great use. Since materials of this type are of particular interest for contact optics, it would be

desirable if the materials also had at the same time high permeability to light.... Accordingly, the object of the present invention was to improve the hydrophilicity or wettability with water of biomedical materials based on cellulose esters of aliphatic carboxylic acids or their blends with EVA, while retaining the permeability to light. The object was achieved by impregnating the material, in the solid form or in a melt, with 2 to 20% by weight of one or more water-soluble vinyl monomers, where appropriate with the addition of 0.01 to 0.5% by weight of a radical initiator which initiates the polymerization in vinyl polymerizations, and then exposing the impregnated material in the solid form or in a melt to a temperature of 60.degree. to 220.degree. C. and/or to the action of light.

Web site: http://www.delphion.com/details?pn=US04532277__

- **Hydroxyethyl cellulose derivatives containing pendant (meth)acryloyl units bound through urethane groups and hydrogel contact lenses made therefrom**

  Inventor(s): Harisiades; Paul (Woodhaven, NY), Rennwant; Ellen (North Tarrytown, NY)

  Assignee(s): Ciba-Geigy Corporation (Ardsley, NY)

  Patent Number: 5,157,093

  Date filed: May 9, 1991

  Abstract: The instant invention relates to methacrylate functionalized hydroxyethyl cellulose which is crosslinked with conventional vinylic monomers to form soft hydrogel contact lenses possessing high oxygen permeability, wettability, and mechanical strength.

  Excerpt(s): The instant invention relates to hydroxyalkylated cellulose (i.e. HEC) derivatives containing pendant (meth)acryloyl units bound to the cellulose backbone, through urethane groups, which are further reacted with a conventional vinylic monomer, and which can be crosslinked to form soft hydrogel contact lenses possessing high oxygen permeability, wettability and mechanical strength.... Hydroxyethyl cellulose has not been proposed as a contact lens material. Vision correction lenses such as contact lenses and intraocular lenses have been known as commercial products for over 25 years. An acceptable lens must be optically clear, mechanically stable, and must provide sufficient optical correction, gas permeability and wettability to insure that the lens is comfortable and safe during use. Gas permeability is important since the corneal surface of the eye respires by obtaining oxygen and other substances from tear fluid and by releasing carbon dioxide and other products of respiration into tear fluid. The intimate contact and position of the contact lens can substantially prevent the exchange of such Constituents between the corneal epithelial cells and tear fluid. As a result the cornea can become starved for oxygen and can accumulate harmful amounts of metabolites within the constituent cells. This can result in corneal edema (swelling) and often extreme discomfort to the wearer. Wettability of the lens is important because a nonwettable lens can be abrasive and irritating to the eye and lid and can cause significant wearer discomfort. A lens must have sufficient mechanical integrity to allow for easy cleaning and handling and maintaining the desired curvature and correction for the individual user. The lens should be immunologically compatible with the eye reducing chances of allergic reaction or toxic response. Further the lens should be permanently dyeable easily manufactured and available at low cost.... In the past contact lenses have been made from synthetic polymeric materials such as plastic matrices based on polyacrylates, polymethacrylates, poly(hydroxyethyl methacrylate), cellulose

acetate butyrate, silicones, etc. More recently contact lenses have been made from collagen, a naturally occurring protein. Miyata, U.S. Pat. No. 4,223,984 is primarily directed to a contact lens made from solubilized defatted transparent crosslinked collagen. Miyata U.S. Pat. No. 4,260,228 is particularly directed to an improved collagen gel soft contact lens prepared from an aldehyde crosslinked gel containing a polyhydroxy compound such as glucose. Miyata, U.S. Pat. No, 4,264,155 is primarily directed to an improved lens made from collagen gel to which a water soluble organic polyhydroxy polymer has been added.

Web site: http://www.delphion.com/details?pn=US05157093__

- **Identifying means for polymeric contact lenses**

  Inventor(s): Erickson; Charles E. (Bellevue, WA), Neogi; Amar N. (Seattle, WA)

  Assignee(s): Precision Cosmet Corp. (Minneapolis, MN)

  Patent Number: 4,193,671

  Date filed: November 20, 1978

  Abstract: A method for providing hydrophilic contact lenses with identifying means incorporated into lens blanks and the resulting lenses in which an elongated identifying strand, fiber, or rod is molded into a cylindrical lens blank rod positioned substantially parallel to the axis of the rod. Lens blanks or buttons are cut transversely to the axis and the lens blanks ground to the proper optical curvatures. The contact lens blanks each contain portions of the identifying means. The finished contact lenses each contain short segments of the identifying means thereby allowing classification of the contact lenses as to right or left eye, magnification power or other characteristic.

  Excerpt(s): This invention relates to the manufacture of polymeric contact lens structures wherein the structure is produced with an identifying means comprising short segments of elongated strand, rod or fiber indicia molded into the structure during manufacture.... This invention further relates to contact lens manufacture wherein a lens is produced having a gradation or variation in physical properties from the central portion to the peripheral skirt portion of the lens and has means for identifying the lens incorporated into the lens during manufacture.... This invention also relates in one variant form thereof to a contact lens having a relatively harder central portion and a softer hydrophilic peripheral skirt portion with identifying means incorporated directly into the lens.

  Web site: http://www.delphion.com/details?pn=US04193671__

- **Injection molding of contact lenses**

  Inventor(s): Ratkowski; Donald J. (1954 E. Glencove, Mesa, AZ 85203)

  Assignee(s): none reported

  Patent Number: 4,254,065

  Date filed: April 4, 1979

  Abstract: The present invention relates to lenses and more particularly relates to the method of forming prescription contact lenses of the single vision, bicurve, lenticular, bifocal and other types by injection molding. The lens is formed from a blank having a cylindrical configuration with a concave or convex surface. The concave or convex

surface forms a surface such as the base curve of the completed lens minimizing finishing operations. The lens blanks are supplied to the practitioners in a series having a completed or substantially completed curved surface. The lenses are formed by injection molding closely controlling parameters such as injection pressure, time, and temperature to avoid internal stress in the lens.

Excerpt(s): Contact lenses formed of plastic material for optical applications are well known. A primary application is the area of contact lenses. Generally, contact lenses fall into two major categories generally characterized as soft hydrophillic and semi-rigid or hard contact lenses which are generally hydrophobic. In addition to characterization of lenses as "soft" or "hard", contact lenses are often classified as corneal or scleral. A scleral lens is a contact lens whose main bearing portion rests upon the sclera of the eye. A corneal lens covers or rests upon the cornea of the eye. Other specialized types of lenses as inter-occular lenses for surgical implantation in the eye are also known.... Because of the stringent quality requirements for first quality contact lenses, extreme precision is required in the making of these lenses. Most plastic contact lens blanks are formed by initially casting an elongate or cylindrical rod from a plastic material, as for example, cellulose acetate butyrate or polymethyl methacrylate. The cylindrical rod is transversely cut to form a number of cylindrical lens blanks or buttons. The blanks, having generally opposite planar surfaces are furnished to the manufacturer and the lenses are machined to prescription and fitted to the patient. Various machining operations may be accomplished. For example, it is common practice to abrade the lens blank using a lathe with a diamond bit or other machine tool such as a spherical rotating grinder. However, the abrading or machining operation will impart markings in the surface of the lenses which impairs optical quality. The lens surface must be optically polished to remove the machined surface markings.... Another problem in forming lenses from elongate rods is that it is difficult to fabricate the rods having a uniform density. Density variations create a considerable optical problem as variations in the refractive index and mechanical properties will result when the lens is manufactured.

Web site: http://www.delphion.com/details?pn=US04254065__

- **Interactive control system for packaging control of contact lenses**

  Inventor(s): Lepper; John M. (Jacksonville, FL), Edwards; Russell J. (Jacksonville, FL), Wang; Daniel T. (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: 5,607,642

  Date filed: June 10, 1994

  Abstract: An interactive control system for controlling the automatic packaging of contact lenses in a contact lens fabrication facility, the interactive control system consisting of a first robot device for periodically transferring individual arrays of a first predetermined amount of discrete contact lens packages each containing a contact lens therein from a first station to an intermediate conveyor where the individual arrays are conveyed to a second station, and a controller for initiating a time stamp for each individual array transferred from the first station and determining elapsed time data for each individual array and for generating position status data indicating a good array or a bad array of defective lenses for each individual array as it is conveyed to the second station, the controller shifting the elapsed time data and position status data for each individual array as it is conveyed on the intermediate conveyor for transfer to the second station.

Excerpt(s): This invention relates generally to a contact lens manufacturing facility for producing ophthalmic contact lenses, and, in particular to a control system for consolidating the serial flow of lens packages for packaging thereof.... The direct molding of hydrogel contact lenses is disclosed in U.S. Pat. Nos. 4,495,313 to Larsen, 4,680,336 to Larsen et al., 4,565,348 to Larsen, and 4,640,489 to Larsen et al., the entire disclosures of which are hereby incorporated by reference in this patent application. Essentially, these references disclose an automated contact lens production process wherein each lens is formed by sandwiching a monomer in a mold cavity formed between back curve (upper) and front curve (lower) mold halves. The monomer is polymerized, thus forming a lens, which is then removed from the mold cavity and subject to further processing such as hydration, automatic lens inspection (ALI), and packaging for consumer use.... Prior art processes significantly reduce the thruput time by hydrating the lens and releasing the lens from the mold cavity with ionized water and a small amount of surfactant without any salts, so that the time consuming ionic neutralization of the polymer from which the lens blank is made does not occur during the hydration process. When deionized water is used, the final step of the process is to introduce buffered saline solution into the final package with the lens and then seal the lens within the package so that the final lens equilibrium (ionic neutralization, final hydration and final lens dimensioning) is accomplished in the package at room temperature or during sterilization.

Web site: http://www.delphion.com/details?pn=US05607642__

- **Lathe for making contact lenses**

  Inventor(s): Bendini; Alberto (VIA Vivaldi 18, Brescia, IT)

  Assignee(s): none reported

  Patent Number: 4,134,315

  Date filed: May 5, 1977

  Abstract: A lathe for forming contact lenses in a single cut includes a support member for hingedly mounting the tool holder turret. A lever arm extends from the tool holder turret and perpendicular to the rotational axis thereof for supporting two rollers, the first of which is positioned at the free end of the lever arm and the second of which is positioned intermediate the first roller and the axis of rotation of the turret. There is also provided a circular cam having a rising profile on which the first roller rides.

  Excerpt(s): The purpose and the behaviour of a contact lens, that is of the small concave-convex lens which floatingly sticks to the cornea, on the interposed lachrymal liquid are well known.... It is also well known the geometric formulation of a contact lens which is indicated as being normal, due to it being free from those aberrations of sphericity which are obtained by machining, compensate for the symmetric imperfections of the corneal topography or natural optical system.... The multisphericity of the concave back is connected instead with the physiological opportunity to build up "in negative" on the lens as exactly as possible, the shape existing "in positive" on the corneal surface bearing the lens.

  Web site: http://www.delphion.com/details?pn=US04134315__

- **Lens molds with protective coatings for production of contact lenses and other ophthalmic products**

  Inventor(s): Li; Hongwen (Palo Alto, CA), Ruscio; Dominic V. (Webster, NY), Lai; Yu Chin (Pittsford, NY), Huang; Horngyih (Penfield, NY)

  Assignee(s): Bausch & Lomb Incorporated (Rochester, NY)

  Patent Number: 6,565,776

  Date filed: June 12, 2000

  Abstract: This invention relates to the preparation of molds for the production of contact lenses and other ophthalmic articles. By using an inorganic material to coat the optical surfaces and sidewalls of mold parts made from clear-resin materials, manufacturers can produce lens molds with greater dimensional stability and chemical resistance. In addition to protecting the clear resin from interaction with otherwise reactive monomers from which the molded article is made, such coatings can also be used to achieve preferential release of the molded article. The resulting mold is especially useful for providing an economical way to improve manufacturing quality of contact lenses.

  Excerpt(s): This invention is directed to improved lens molds for the production of contact lenses, intraocular lenses, and other ophthalmic products. In particular, the invention involves protective coatings for allowing for the use of mold materials having improved dimensional stability and/or increased light transparency. The invention is also directed to a method of making the improved lens molds and their use in the manufacture of contact lenses.... The molds used in the manufacture of soft (hydrogel) contact lenses have been made from a variety of rigid thermoplastic resins. For example, U.S. Pat. No. 5,540,410 to Lust et al and U.S. Pat. No. 5,674,557 to Widman et al. disclose mold halves made from polystyrene, polyvinyl chloride, polyethylene, polypropylene, copolymers of polystyrene with acrylonitrile and/or butadiene, acrylates such as polymethyl methacrylate, polyacrylontrile, polycarbonate, polyamides such as nylons, polyesters, polyolefins such as polyethylene, polypropylene and copolymers thereof, polyacetal resins, polyacrylethers, polyarylether sulfones, and various fluorinated materials such as fluorinated ethylene propylene copolymers and ethylene fluoroethylene copolymers. Polystyrene is preferred by Widman et al because it does not crystallize and has low shrinkage. An earlier patent, U.S. Pat. No. 4,661,573 to Ratkowski et al, discloses, for the processing of fluorosilicone copolymers into extended wear lenses, molds formed of polypropylene, polyethylene, nylon, Teflon.RTM., glass, or aluminum having its mold surfaces coated with Teflon.RTM. polymer.... The manufacturers of soft contact lenses have discovered that if the molds used to make the lenses are sufficiently inexpensive, it is more economical to discard the molds after production of the lenses from the molds than it is to clean the molds to be reused. Polypropylene is a good example of an inexpensive resin that has been used to make molds that can be discarded at minimal cost. Another advantage of polypropylene is that unlike many resins, polypropylene can resist interaction with the monomers used to make the contact lenses. The ability to resist chemical interaction prevents the lens and the mold from adhering to each other and simplifies their separation following lens production.

  Web site: http://www.delphion.com/details?pn=US06565776__

- **Liquid cleaner containing inactivated protease for protein soiled contact lenses**

  Inventor(s): Chanda; Subir (17 Arlington Dr., Pittsford, NY 14534), Riedhammer; Thomas M. (52 Appian Dr., Rochester, NY 14606), Tometsko; Andrew M. (105 Brooklawn Dr., Rochester, NY 14618)

  Assignee(s): none reported

  Patent Number: 4,715,899

  Date filed: April 11, 1984

  Abstract: Protein soiled contact lenses are conveniently cleaned by the concurrent use of an aqueous solution containing an inactivated sulfhydryl protease and an aqueous mild thio reducing agent. The protease is allosterically inactivated by reaction with sodium tetrathionate.

  Excerpt(s): This invention relates to a method for removing proteinaceous deposits from contact lenses and the inactivated protease used therein.... One of the problems connected with the soft contact lenses is the method of their cleaning. The very property of the hydrophilic soft lenses, which allows them to absorb up to 150% by weight of water, also allows formulations which might otherwise be used for cleaning to be absorbed and even concentrated and later released when the soft contact lens is on the eye. The release may be much slower than the uptake; therefore, the cleaner continues to build up in the lenses. This build-up eventually affects the physical characteristics of the lenses, including dimension, color and the like. This can have the harmful result of damaging or staining the contact lens itself and/or harming the sensitive tissues of the conjunctiva or cornea.... U.S. Pat. No. 3,910,296 to Karageozian and Rudko discloses a method of removing proteinaceous deposits from soft contact lenses by use of an aqueous solution of proteolytic enzyme such as papain. However, because this solution is autodigestive, its effective shelf storage life is only 12 to 24 hours. Therefore, the desired protease, along with enhancer, adjuvants and modifiers, must be prepared in an absolutely dry form tablet which is hermetically sealed and then distributed to the wearer of contact lenses. The ultimate wearer must then prepare the actual aqueous protease solution used to remove protein deposits from the contact lens. Absolute dryness of the tablet at all times is required if autodigestion and decomposition prior to actual use are to be avoided.

  Web site: http://www.delphion.com/details?pn=US04715899__

- **Liquid composition for contact lenses and method for cleaning a contact lens**

  Inventor(s): Nakagawa; Akira (Nagoya, JP), Kondo; Satoko (Nagoya, JP), Oi; Yoshiko (Nagoya, JP)

  Assignee(s): Tomei Sangyo Kabushiki Kaisha (Nagoya, JP)

  Patent Number: 5,281,277

  Date filed: April 8, 1992

  Abstract: A liquid composition for contact lenses, having from 5 to 40% (w/v) of glycerol and from 4 to 20% (w/v) of boric acid and/or a borate incorporated to a solution containing an effective amount of a protease, in such a ratio that the boric acid and/or the borate is from 10 to 100 parts, preferably 10-20 parts, by weight per 100 parts by weight of the glycerol.

Excerpt(s): The present invention relates to a liquid composition for contact lenses and a method for cleaning a contact lens. More particularly, it relates to a cleaning solution for contact lenses, which is useful for both water non-containing contact lenses and water containing contact lenses, and a method for cleaning a contact lens by means of such a cleaning solution.... Contact lenses are generally classified into those made of water containing material and those made of water non-containing material. As water containing contact lenses, those made essentially of polyhydroxyethyl methacrylate or polyvinyl pyrrolidone, are known. As water non-containing contact lenses, those made essentially of polymethyl methacrylate or silicone rubber, and those made of an oxygen-permeable copolymer of polysiloxanyl methacrylate with methyl methacrylate, are known. With contact lenses made of water containing material among them, components in a cleaning solution or in a preserving solution, are likely to penetrate into the lenses. Therefore, if such a treating solution contains an irritant component or if the osmotic pressure of such a treating solution is excessively high beyond the physiological level, irritation or conjunctival hyperemia is likely to be brought about when the lenses are put on the eyes. Accordingly, it is necessary to pay a due attention to the safety and the concentrations of components constituting the treating solution.... When contact lenses are put on the eyes, soils such as proteins derived from lacrimal components tend to deposit thereon, whether the contact lenses are water containing or water non-containing. It has been common to employ a method to decompose and remove them by means of a protease. Such a protease is unstable in a solution state, and it gradually loses its activity. Therefore, it is difficult to supply such a protease in a solution state to the user. Therefore, it has been common to supply it in the form of a solid formulation such as a tablet, a granule or a powder, so that the user may use it by dissolving the formulation in e.g. purified water, as the case requires. However, in this method, the protease in a solid state has to be dissolved each time of its use, thus presenting cumbersomeness to the user.

Web site: http://www.delphion.com/details?pn=US05281277__

- **Marking of mold inserts to produce marked contact lenses**

  Inventor(s): Williams; Wayner E. (Orange Park, FL), Duarte; Mark A. (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: 5,641,437

  Date filed: September 29, 1995

  Abstract: A method for producing visible marks in molded contact lenses, particularly soft hydrogel contact lenses, by placing a recessed mark configuration in a metal insert. The metal insert is subsequently used to produce injection molding frames, which are then subsequently used in the molding of the final contact lenses. The recessed mark configuration is at least approximately 10 microns deep, has a Volume Index, which is the ratio of the quantity volume below a reference surface minus the volume above the reference surface over the volume below the reference surface, of at least approximately 0.9. The recessed mark configuration also preferably has a ratio of surface roughness (RMS or Ra) to a peak-to-valley (PV) measurement, RMS/PV or of Ra/PV, of greater than approximately 0.15. The recessed mark configuration in the metal insert is subsequently transferred as a raised portion to the injection molded frames, and is then subsequently transferred as a visible recessed mark in contact lenses molded in the frames prepared using the inserts. The ratio of the surface roughness (RMS or Ra) to the height (H), wherein H is the distance between two reference lines in a profile of the

mark, RMS/H or Ra/H, is at least approximately 1.5. A preferred method of imparting the recessed configuration to the insert is by Electric Discharge Machining (EDM). The dimensions of the several parameters can be verified by using a noncontact scanning white light interferometer.

Excerpt(s): The present invention relates generally to the marking of mold inserts to produce marked contact lenses, and more particularly pertains to electric discharge machining of mold inserts for contact lenses. The present invention is efficient, controllable, repeatable, and provides a readily visible mark in the final lens product without adding significantly to the expense of manufacture thereof.... The present invention relates to a method of imparting visible marks to stabilized soft molded (SSM) hydrogel contact lenses. Such visible marks are used as inversion indicators, which are visible marks of a special design placed on the lens to allow the user to determine if the lens is in the proper configuration or to determine if it has been inverted so as to be inside out. Other visible marks can be employed as trademarks to identify the manufacturer. Visible marks are also required in those types of contact lenses which require orientation with respect to the eye for insertion. Visible marks are also desirable to allow a user to more easily see and locate the lens when it is in a solution, such as a saline solution used in the original packaging of the contact lens or in a storage container.... The prior art discloses many technical approaches for solving the problem of imparting visible marks to contact lenses. Laser etching or burning is taught by EP 291459 and JP 61223820. Diamond point engraving is disclosed in DE 3316730. Printing techniques, some of which use photosensitive materials which are subjected to UV energy, are shown in GB 200614, DE 3219890 and JP 61211382, among others. Other coloring or dying techniques are disclosed in JP 62186221, JP 62186222, JP 62250286, among others.

Web site: http://www.delphion.com/details?pn=US05641437__

- **Markings for contact lenses**

  Inventor(s): Neadle; Susan (Jacksonville, FL), Stanley; George (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: 6,042,230

  Date filed: December 14, 1998

  Abstract: The invention provides marks for use in contact lenses and contact lenses that contain the marks, which marks are highly visible. The marks of the invention are useful for determining the inside versus the outside of the lens as well as for diagnostic purposes.

  Excerpt(s): The invention relates to marks useful in ophthalmic lenses. In particular, the invention relates to contact lenses that have highly visible marks.... The use of marks on contact lenses for indicating whether the lens is for the right or left eye is well known. Additionally, it is known to use marks for indicating serial numbers, lot and batch numbers, and optical powers. Finally, marks have been used to measure the rotation of the lens on the eye as well as to orient the lens for inspection by quality control personnel.... One problem with some of the known marks is that they are difficult to see. Thus, a need remains for marks with improved on-eye visibility so that the mark may be used as a diagnostic tool. Additionally, a need remains for marks with improved off-eye visibility so that the wearer may differentiate the inside from the outside of the lens.

  Web site: http://www.delphion.com/details?pn=US06042230__

- **Measuring set for determination of the sagittal depth and the average central curvature of gel contact lenses**

  Inventor(s): Wichterle; Otto (Prague, CS), Svantner; Jiri (Unhost, CS)

  Assignee(s): Ceskoslovenska akademie ved (Prague, CS)

  Patent Number: 4,205,452

  Date filed: September 21, 1978

  Abstract: The invention pertains to a measuring set for determination of the sagittal depth and the average central curvature of soft contact lenses which consists of two measuring units based on the principle of depth gauges and the common electronic indication part. The apparatus serves for rapid and inexpensive selection of the correct contact lens according to the shape and peculiarities of the patient eye. Each measuring unit consists of a fixed part formed by a support plate, a stable conductive hollow screw, and a coaxially fitted conductor insulated from the screw and protruding above the insulation, and a movable part formed by a conductive nut bearing an insulation bushing for the protruding conductor and a scale and put on the screw.

  Excerpt(s): The present invention pertains to the measuring set for determination of the sagittal depth and the average central curvature of gel contact lenses in the swollen state.... Besides the measurement of refraction of soft contact lenses in their optical zone, it is also important for their application to measure their entire shape. It is suitable, for the rational selection of an optimum lens according to individual pecularities of the patient eye, to ascertain at least the fundamental indices of the shape of the inner arch of lens, i.e. the sagittal depth of lens of the one hand, and the average inner curvature of the central part of lens on the other, that is of that part which exceeds its optical zone and reaches to the eye limbus or the average curvature from the centre up to the diameter of about 10 mm.... In addition to optical methods, a method using the known principle of depth gauge was suggested for this purpose and apparatuses were developed where a metal needle is slowly slid into a lens freely placed on a circular edge of the given diameter by means of an electric motor drive as far as to the contact with lens centre.

  Web site: http://www.delphion.com/details?pn=US04205452__

- **Method and apparatus for buckling contact lenses**

  Inventor(s): Thomas; Penrhyn F. (3rd Floor 149 Castlereagh Street, Sydney NSW 2000, AU)

  Assignee(s): none reported

  Patent Number: 4,900,482

  Date filed: July 29, 1987

  Abstract: A method and apparatus for buckling contact lenses includes mounting a lens blank to be buckled on the contoured surface of a lens mounting tool so that the lens adopts a datum position, bringing a protruding element or elements into contact with the lens, such that the lens' contact point is coincident with the datum level, setting an indicator gauge to a setting to indicate the position of the contact point, moving the element or elements away from touch contact with the lens, setting a new elevation of the mounting tool by displacing the mounting tool over a distance commensurate with

the predetermined degree of buckling of the lens required, and bringing the protruding element or elements into descending engagement with a portion of the lens, thereby buckling the lens to the shape of the contoured surface of the lens mount until the protruding elements have been displaced, the predetermined distance relative to the datum.

Excerpt(s): The present invention comprises an improved method of buckling Toric Contact Lenses utilising a machine designed to buckle contact lens surfaces by a predetermined amount. More particularly the invention relates to a lens buckling machine which can be set so as to accurately buckle a lens according to a predetermined amount commensurate with the setting and according to prescription.... In contact lens technology contact lenses are provided with a manufactured curvature and it is critical to the proper manufacturing and functioning of a contact lens that it be curved accurately. One reason for the need for accurate curvature is that the lens must locate on the eye such that there is no compression of the eye or eye blood vessels nor general eye discomfort caused to the wearer if the lens is inaccurately curved. The curvature is also critical to the particular astigmatic requirements of the eye.... The above problems can occur where the curve of the lens is not compatible with the radius of curvature of the particular eye surface of the wearer of the lens.

Web site: http://www.delphion.com/details?pn=US04900482__

- **Method and apparatus for demolding ophthalmic contact lenses**

  Inventor(s): Martin; Wallace Anthony (Orange Park, FL), Kindt-Larsen; Ture (Holte, DK), Walker; Craig William (Jacksonville, FL)

  Assignee(s): Johnson & Johnson Vision Products, Inc. (Jacksonville, FL)

  Patent Number: 5,935,492

  Date filed: November 26, 1997

  Abstract: Methods and apparatus which are utilized for the production of ophthalmic lenses, and more particularly, a method for the removal or demolding of molded ophthalmic contact lenses from the individual molds in which they are produced. The apparatus implements the demolding of such ophthalmic lenses, the latter of which may consist of suitable hydrogel contact lenses or other types of high-precision ophthalmic lenses; for example, such as intraocular contact lenses. Mechanical prying apart of such mating mold half portions, and to facilitate this procedure at a reduced application of force, while concurrently potentially preventing or at least appreciably ameliorating the extent of any possible sticking together of the mold half portions is effected in that mechanical leverage applied to the upper mold half portion, in addition to the application of the heating action thereto.

  Excerpt(s): The present invention relates generally to methods and apparatuses which are utilized for the production of ophthalmic lenses, and more particularly, pertains to a method for the removal or demolding of molded ophthalmic contact lenses from the individual molds in which they are produced. Moreover, the invention is also directed to the provision of novel apparatus for implementing the demolding of such ophthalmic lenses, the latter of which may consist of suitable hydrogel contact lenses or other types of high-precision ophthalmic lenses; for example, such as intraocular contact lenses, and wherein the apparatus is especially suited for implementing the inventive lens removal or demolding methods.... The phenomenal growth of the industry which is engaged in the manufacture of the evermore popular ophthalmic contact lenses, especially the

aspects of the industry which pertains to the supplying of contact lenses which are intended for frequent periodic replacement by a wearer, has dramatically increased the need for the mass-production of immense quantities of such lenses which are of a consistently high quality while being inexpensive to produce. Consequently, commensurate with the foregoing needs of the industry, this has necessitated manufacturers of such lenses to strive for the development of automated methods and apparatuses which are particularly adaptable to high-speed automated production practices, and which perform with consistency at adequate degrees of accuracy or precision in a highly cost-effective and consequently economically viable manner.... Pursuant to the currently developed technology which is concerned with the production of ophthalmic lenses, particularly such as soft contact lenses of the hydrogel type, there is normally utilized a monomer or monomer mixture which is polymerizable in a plastic mold. Generally, although not necessarily, the material for the ophthalmic contact lenses is selected from a suitable hydrophilic material, preferably a monomer to form a so-called HEMA-based polymer (hydroxyethyl-methacrylate), although other suitable polymerizable monomers may also be employed for the lenses, as discussed further on hereinbelow.

Web site: http://www.delphion.com/details?pn=US05935492__

- **Method and apparatus for marking contact lenses**

  Inventor(s): Sliger; Richard (Tuscon, AZ)

  Assignee(s): Precision Cosmet Co., Inc. (Minnetonka, MN)

  Patent Number: 4,457,761

  Date filed: February 16, 1983

  Abstract: The method and apparatus for marking of soft contact lenses with identification indicia is disclosed. A film cartridge is provided for supporting a non-gel film having lens marking indicia gel or dye disposed thereon. The cartridge has an opening therein to access the film and a backing pad is positioned proximate the film opposite the opening to disperse marking contact force. A lens supporting pedestal having a curvilinear head is provided for supporting the lens in a marking position. A pair of spring biased latches are provided for engaging either end of the cartridge which includes recesses to engage the latching members. A guide is provided for aligning the cartridge, and the film supported therein, with the curvilinear marking head. The cartridge and pedestal are sized to cause a predetermined force to be applied to the film against the backing pad through the lens to be marked. To mark a lens, it is cleaned, rinsed and dried, and positioned on the curvilinear head. The film cartridge, with the gel indicia bearing film aligned therein, is then inserted over the guide and latched into place for one minute, whereby the gel or dye indicia is transferred from the film to the lens. After the cartridge is removed, a developer is applied to the lens in the area to mark for a brief time to make the indicia permanent, and the lens is rinsed under a stream of saline solution and thermally disinfected.

  Excerpt(s): The present invention pertains to the field of ophthalmology, and more particularly to a method and apparatus for marking contact lenses.... Contact lenses for the correction of vision are now in widespread use, providing a practical and sometimes advantageous alternative to glasses for most individuals requiring correction of imperfect vision. The first commercially successful contact lenses were the so called hard contacts, so named by virtue of their rigid construction. However, due in part to their rigidity, which made optimum fitting difficult to achieve, and in part to eye lubrication

difficulties resulting from the relative impermability of the typical hard lens materials, acceptance of the hard contact lens was and still is limited.... In response to the drawbacks of hard contact lenses, flexible and permeable contact lenses were developed, and these types of contact lenses have come to be known as hydrophilic or soft contacts. The soft contact lens provides for a substantially better fit to the contours of the eye and additionally permits more natural eye lubrication by virtue of its permeable or hydrophilic properties. However, distinguishing between the left and right lens of a soft contact lens pair has proved to be considerably more difficult than in the case of hard contact lenses. Additionally, unlike the hard lens, the soft lens is subject to inversion and this too, like the above noted problem, is difficult to distinguish or identify until the lens is in place on the eye. In view of the relative difficulty of inserting and removing a lens, it is desirable that each lens is marked, usually near its edge, whereby identification of the right and left lens, as well as the proper orientation, i.e. inverted vs. noninverted, may be easily accomplished by the wearer before insertion.

Web site: http://www.delphion.com/details?pn=US04457761__

- **Method and apparatus for measuring soft contact lenses**

  Inventor(s): Gordon; Michael D. (10225 E. 71st South, Derby, KS 67233), Long; Norris R. (5166 S. Vine, Wichita, KS 67217)

  Assignee(s): none reported

  Patent Number: 4,796,991

  Date filed: May 20, 1987

  Abstract: This invention relates to a method and apparatus for measuring the optical power of soft contact lenses having a lens holding apparatus which is mountable on known prior art lensmeter structures. The lens holding apparatus includes a basic support housing means, a lens holder assembly mounted on the basic support housing means, and a lens conditioner means connected to the basic support housing means and operably engagable with the lens holder assembly. The lens holder assembly includes a contoured lens support member having a transparent lens support surface to substantially duplicate the outer contour and size of a person's eye. The lens conditioner means includes a lens wiper assembly operable through an actuator linkage assembly to move a wiper blade member over the contoured lens support member with a soft contact lens mounted thereon to provide a wetting action on both sides of the soft contact lens to duplicate the conditions when worn on the cornea of a person's eye. This operation substantially duplicates the condition of the soft contact lens as being worn on the cornea of a person's eye. The method of this invention relates to optical power measurement with the use of a lens support member being (1) cleansing; (2) wetting; (3) wiping; (4) measuring the soft contact lens; and (5) periodically rewetting and operating the device as required.

  Excerpt(s): Numerous of the above cited patent references are not pertinent to the applicant's specific invention as it is drawn to the area utilizing a lensmeter for measuring soft contact lenses with a lens holding apparatus.... The McCormack U.S. Pat. No. 3,804,523 discloses a radiuscope thickness adaptor to measure the thickness of flexible lenses but is substantially different in structure and operation relative to applicant's invention.... A second McCormack U.S. Pat. No. 3,820,899 is also drawn to a surface inspection adaptor plate for use with flexible type lenses but fails to provide sufficient support to the lens to achieve accurate power measuring results.

Web site: http://www.delphion.com/details?pn=US04796991__

- **Method and apparatus for molding contact lenses and making their container**

  Inventor(s): Shannon; John H. (Hamlin, NY)

  Assignee(s): Bausch & Lomb Incorporated (Rochester, NY)

  Patent Number: 5,524,419

  Date filed: February 2, 1995

  Abstract: An improved, automated method and apparatus for molding contact lenses generally comprises the steps of: (1) forming anterior and posterior mold cavities in longitudinally spaced relation in first and second webs of material, respectively; (2) dispensing a liquid, curable, lens material (e.g., monomer) in each anterior cavity of the first web; (3) aligning and bringing the posterior and anterior cavities into sequential, mating, centered engagement with each other; (4) curing the lens material captured between respective posterior and anterior molds; and (5) separating the webs to release the lenses cast therebetween. In an advantageous embodiment of the invention, the mold cavities are vacuum-formed in the respective webs, and packaging receptacles are formed in one or both of the webs used to mold the lenses.

  Excerpt(s): The present invention pertains to a method and apparatus for molding lenses, and particularly to a method and apparatus for molding lenses such as contact lenses which have a finished edge and which are suitable for wearing directly on the eye. The invention more particularly pertains to a novel method and apparatus for molding contact lenses and making their containers which utilizes continuous web feeding methods wherein the lenses are molded between posterior and anterior mold cavities formed in first and second webs of material, respectively. The webs are brought together in aligned fashion by synchronized feeding mechanisms for curing of a liquid lens material previously disposed within one of the cavities, and thereafter separated from one another to expose the molded lenses. In an advantageous embodiment of the invention, packaging containers for the molded lenses are formed in the same web of material in which the lenses are molded.... Cast molding of contact lenses has proven a reliable and economical method of high volume lens production. In this regard, manufacturing methods of molded lenses have seen increased emphasis on mold techniques which consistently produce non-reject lenses on a large production scale. Attention is directed to U.S. Pat. No. 5,271,875 which issued on Dec. 21, 1993 and is of common ownership with the present application, the '875 patent being incorporated herein by reference. The '875 patent relates to a method of molding a contact lens using anterior and posterior mold halves which are used only once by being brought together to mold the lens therebetween, separated following curing of the lens material, and then discarded. As described in the '875 patent, the mold halves include tapered side walls to form cooperating alignment means between the mold halves as they are brought together and clamped (see FIGS. 2-17 therein) or taper-locked (see FIGS. 21-24 therein) to provide the needed force to squeeze the mold halves together during polymerization. More particularly, deformable rim and annulus features 52 and 47 encircling the surface cavities of the anterior and posterior mold halves, respectively, are provided for engaging and deforming against one another during curing of the monomer contained in the mold by virtue of a clamping force applied to the mold halves. The juncture of the rim and annulus features forms the finished edge of the lens in addition to accommodating shrinkage of the lens material during curing thereof by slowly bringing the respective mold surface cavities toward one another as the rim and annulus features

forcibly deform against one another.... While the method and apparatus of the '875 patent is effective at consistently producing substantial numbers of non-reject lenses on a large manufacturing basis, there remains a desire to continuously reduce costs through, for example, improved automation and packaging techniques.

Web site: http://www.delphion.com/details?pn=US05524419__

- **Method and apparatus for spreading monomer mixtures in molds for the centrifugal casting of contact lenses**

  Inventor(s): Wichterle; Otto (Praha, CS), Vodnansky; Jiri (Praha, CS)

  Assignee(s): Ceskoslovenska akademie ved (Praha 1, CS)

  Patent Number: 4,722,813

  Date filed: January 14, 1985

  Abstract: A method and apparatus are provided for spreading monomer mixture in molds for the centrifugal casting of contact lenses, wherein the said molds containing a monomer mixture are rotated around their axis with the frequency 0.5 to 5 revolutions per minute and, at the same time, the axis of molds is periodically tilted between extreme positions, the angle to the vertical direction of which is in the first extreme position 30.degree. to 60.degree. and in the second extreme position 70.degree. to 100.degree. and the frequency of tilting is twice to ten times lower than the frequency of rotation.

  Excerpt(s): The invention pertains to a method and apparatus for spreading monomer mixtures in molds for the centrifugal casting of contact lenses.... In the monomer casting of contact lenses in rotating molds provided with a limiting sharp edge according to the Czechoslovak Pat. No. 116,260 (counterpart to U.S. Pat. No. 3,408,429), the monomer mixture has to be introduced as high as very near to the limiting edge. This has been achieved, e.g., by rotating the mold, before it is exposed to the polymerization conditions, to a higher speed than is the rotation speed eventually required for the formation of a precise meniscus just before starting the polymerization. Another method has consisted in introducing a fine stationary string into the rotating mold which stirs and lifts the rotating mixture up to the sharp edge. A similar effect of even spreading of the monomer mixture was also obtained by introducing a sharp stream of nitrogen into the rotating mold to stir the monomer mixture.... The above said methods cannot be used in the novel method of centrifugal casting in rotating columns, which carry a column of molds with monomer mixture, e.g., according to the Czechoslovak Pat. No. 159,359 and the Czechoslovak Patent Application No. PV 1027-83 now Czechoslovak Certificate of Authorship No. 237,592. It was possible to help the mixture in spreading in the molds which form a column in tubular magazines by subjecting the magazines to a very slow rotation in an oblique position, when the monomer mixture coalesced in a drop, which slowly moved along the limiting sharp edge. This method was fairly successful in the production of a relatively thick-walled lenses. As soon as the trend in contact lenses has been directed to ultrathin lenses, complications occured caused by the fact, that a thin film of a small charge of monomer mixture did not manage to flow as far as to the edge at a small slope of the slowly rotating mold or a rather tin film was formed in the center of mold at a too large slope of the rotating mold, which broke through thus forming a hole in the center of a nonwetted pair of the mold during the following polymerization.

  Web site: http://www.delphion.com/details?pn=US04722813__

Patent Applications on Contact Lenses

As of December 2000, U.S. patent applications are open to public viewing.[10] Applications are patent requests which have yet to be granted. (The process to achieve a patent can take several years.) The following patent applications have been filed since December 2000 relating to contact lenses:

- **Casting mold half and casting mold for producing contact lenses**

  Inventor(s): Hagmann, Peter; (Erlenbach am Main, DE), Horner, Wilhelm; (Sulzbach, DE)

  Correspondence: THOMAS HOXIE; NOVARTIS, PATENT AND TRADEMARK DEPARTMENT; ONE HEALTH PLAZA 430/2; EAST HANOVER; NJ; 07936-1080; US

  Patent Application Number: 20030077350

  Date filed: October 9, 2002

  Abstract: A casting mold half (5, 5a) for producing contact lenses comprises a mount (50) and an insert (51, 51a), which is arranged at one end of the mount (50) and can be connected to the mount (50) and which has a shaping surface (510) for the shaping of the front or rear surface of the contact lens to be produced. The insert (51, 51a) consists in the region of the shaping surface (510) of a material which is permeable to the energy crosslinking the starting material of the contact lens. Finally, a mask made of a material impermeable to the energy crosslinking the starting material is provided for spatially delimiting this energy. The mask comprises a separate surround (512) made of a material impermeable to the energy crosslinking the starting material of the contact lens, which surrounds the edge region of the shaping surface (510) of the insert (51, 51a).

  Excerpt(s): The invention relates to a casting mold half and a casting mold for producing contact lenses.... In automatic contact lens production processes, in particular for the production of contact lenses which are to be produced cost-effectively in large numbers, the contact lenses are preferably produced by what is known as the mold or full-mold process. In these processes, the lenses are produced in their final shape between two casting mold halves (molds), so that neither subsequent machining of the surfaces of the lenses nor machining of the edge is required. Mold processes are described, for example, in WO-A-87/04390 or in the EP-A 0 367 513.... In these known mold processes, the geometry of the contact lens to be produced is established by the cavity defined between the casting mold halves. The edge of the contact lens is likewise formed by the casting mold, usually comprising two casting mold halves. The geometry of the edge is established by the contour of the two casting mold halves in the region in which they contact each other.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

[10] This has been a common practice outside the United States prior to December 2000.

- **Coated contact lenses and methods for making same**

  Inventor(s): Jahnke, Richard L. (Bark River, MI)

  Correspondence: STOUT, UXA, BUYAN & MULLINS LLP; 4 VENTURE, SUITE 300; IRVINE; CA; 92618; US

  Patent Application Number: 20030165015

  Date filed: November 27, 2002

  Abstract: Coated contact lenses are produced by providing a lens and coating at least a portion of a surface of the lens derived from a binder component and an activation component. The binder component comprises a binding polymer component with at least one epoxy group, and preferably at least two epoxy groups, per polymer molecule. The activation component is capable of reacting with the binding polymer component to form a crosslinked polymer component. Methods of coating lenses and coating compositions are also provided.

  Excerpt(s): This application claims the benefit of U.S. Provisional Application Serial No. 60/336,832, filed Dec. 5, 2001, the disclosure of which is incorporated in its entirety herein by reference.... The present invention relates to methods of coating lenses, coating compositions and coated lenses. More particularly, the invention relates to methods of coating contact lenses, coating compositions which are useful in such methods, and coated lenses, such as coated contact lenses, produced using such methods and/or such coating compositions.... Various methods have been developed and employed in the contact lens industry to coat contact lenses. Although some progress has been made in the field, there remain some serious deficiencies in these methods and the need for new lens coating methods.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Colorants for use in tinted contact lenses and methods for their production**

  Inventor(s): Wood, Joe M. (Jacksonville, FL), Collins, Gary L. (Jacksonville, FL), Weber, Julieann E. (Atlantic Beach, FL), Kindt-Larsen, Ture; (Holte, DK), Ford, James D. (Orange Park, FL), Chehab, Khaled; (Jacksonville, FL), Molock, Frank F. (Orange Park, FL), Walker, Craig W. (Jacksonville, FL)

  Correspondence: AUDLEY A. CIAMPORCERO JR. JOHNSON & JOHNSON; ONE JOHNSON & JOHNSON PLAZA; NEW BRUNSWICK; NJ; 08933-7003; US

  Patent Application Number: 20030000028

  Date filed: December 20, 2001

  Abstract: The invention provides a colorant for use in tinting contact lenses in which the binding polymer used is capable of forming an interpenetrating polymer network with the lens material. When the colorants of the invention are applied to uncured lens material that is subsequently cured, the binding polymer forms an interpenetrating polymer network with the lens material embedding the colorant within the lens material resulting in a stable, tinted lens.

  Excerpt(s): This application is a continuation-in-part of U.S. Ser. No. 09/792,671 (VTN-530) filed Feb. 21, 2001.... The invention relates to colorants useful in the production of tinted contact lenses. In particular, the invention provides a one step process for tinting contact lenses and colorants for use in the process.... The use of tinted contact lenses to alter the natural color of the iris is well known. Generally, the tinted portion of the lens

is located in the center of the lens, the portion of the lens that will overlay either or both the pupil and iris of the lens wearer. It is also well known in the tinting of contact lenses that the entire lens may be lightly tinted as a visibility or locator tint.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Composition for treating contact lenses**

  Inventor(s): Simpson, Lisa C. (Rochester, NY), Lever, Andrea; (Pittsford, NY), Hu, Zhenze; (Pittsford, NY)

  Correspondence: BAUSCH & LOMB INCORPORATED; ONE BAUSCH & LOMB PLACE; ROCHESTER; NY; 14604-2701; US

  Patent Application Number: 20030153475

  Date filed: December 9, 2002

  Abstract: A method for cleaning contact lenses employs a composition that includes tromethamine in an amount effective to reduce the amount of denatured protein on the contact lens, thus rendering the contact lenses easier to clean. Additionally, by soaking contact lenses in the composition prior to inserting the lens on the eye, the compositions provide a prophylactic effect in preventing protein denaturation while the contact lens is worn.

  Excerpt(s): Priority is hereby claimed in the present nonprovisional application to Provisional Application Serial No. 60/342,869 filed Dec. 20, 2001, in accordance with 37 CFR 1.78(a)(4).... This invention relates to compositions and methods for cleaning, and preferably also disinfecting, contact lenses. The compositions reduce the amount of denatured protein on the contact lens, thus rendering the contact lenses easier to clean. Additionally, by soaking contact lenses in the composition prior to inserting the lens on the eye, the compositions provide a prophylactic effect in preventing protein denaturation while the contact lens is worn, thus preventing denatured proteins from accumulating on the contact lens surface while worn.... In the normal course of wearing contact lenses, tear film and debris composed of proteinaceous, oily, sebaceous, and related organic matter have a tendency to deposit and build up on lens surfaces. As part of the routine care regimen, contact lenses must be cleaned to remove these tear film deposits and debris. If these deposits are not properly removed, both the wettability and optical clarity of the lenses are substantially reduced causing discomfort for the wearer.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **COMPOSITIONS FOR CONTACT LENSES**

  Inventor(s): NAKAYAMA, HISAYUKI; (NISHINOMIYA-SHI, JP), NAKAJIMA, TAKUYA; (KOBE-SHI, JP), DOI, KOJI; (KOBE-SHI, JP), AKI, HIROSHI; (KOBE-SHI, JP)

  Correspondence: WENDEROTH LIND & PONACK; 2033 K STREET NW; SUITE 800; WASHINGTON; DC; 20006; US

  Patent Application Number: 20020103099

  Date filed: April 19, 2000

  Abstract: The present invention provides an agent for contact lenses, which contains an oxo-acid compound and/or a polyacid compound. The agent for contact lenses of the present invention can remove protein as, for example, a protein remover, irrespective of

the kind of contact lens and without using a special cleaning device. In addition, washing with water after protein removal is not necessary.

Excerpt(s): The present invention relates to an agent for contact lenses. More particularly, the present invention relates to an agent for contact lenses, which contains an oxo-acid compound and/or a polyacid compound.... In recent years, various kinds of contact lenses, such as hard contact lens, oxygen permeable hard contact lens, soft contact lens and the like, have been widely used. These contact lenses easily become unclean due to the components contained in lacrimal fluid, such as protein, and require daily cleaning, sterilization and preservation.... The stain (e.g., protein) attached to the surface of a contact lens can be decomposed and removed by protease, and many cleaning agents have been proposed. For example, an agent in a solid form, which mainly contains a protease, such as tablet, granule, powder and the like, is supplied and an end user dissolves the agent each time in purified water and the like before use. This method requires dissolution of protease in a solid state every time the agent is used. As a result, the end user is forced to suffer from high cost and complicated handling.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Contact lenses with blended microchannels**

Inventor(s): Marmo, J. Christopher; (Danville, CA), Dean, Gregg A. (St. Denys, GB)

Correspondence: STOUT, UXA, BUYAN & MULLINS LLP; 4 VENTURE, SUITE 300; IRVINE; CA; 92618; US

Patent Application Number: 20030151718

Date filed: January 6, 2003

Abstract: Contact lenses for use in eyes are provided and include a lens body and a plurality of microchannels defined in a posterior face of the lens body. The microchannels are structured to promote effective tear fluid exchange between an exposed surface of the eye and a surface of the eye covered by the lens body. Each of the microchannels preferably includes a substantially junctionless, convex surface along a major portion of a length of the microchannel.

Excerpt(s): This application is a continuation-in-part of U.S. patent application Ser. No. 10/270,025, filed Oct. 11, 2002, which is a continuation-in-part of U.S. patent application Ser. No. 09/910,355, filed Jul. 20, 2001, which claims the benefit of U.S. provisional application Serial No. 60/221,575, filed Jul. 28, 2000, the disclosures of each of these applications being incorporated in their entirety herein by this specific reference.... The present invention generally relates to contact lenses and more specifically relates to contact lenses having microchannels that promote effective tear fluid exchange.... It has long been recognized that extended wear of contact lenses can lead to corneal complications. Adverse corneal responses to extended contact lens wear are believed to be primarily caused by accumulation of debris trapped at the lens-eye interface.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Contact lenses with microchannels**

  Inventor(s): Marmo, J. Christopher; (Danville, CA)

  Correspondence: Frank J. Uxa; Stout, Uxa, Buyan & Mullins, LLP; Suite 300; 4 Venture; Irvine; CA; 92618; US

  Patent Application Number: 20020021409

  Date filed: July 20, 2001

  Abstract: Contact lenses for use in eyes are provided and include a lens body and a plurality of radially extending microchannels defined in the posterior face of the lens body. In one embodiment, the microchannels are sized and adapted to promote effective tear fluid exchange between an exposed surface of the eye and a surface of the eye covered by the lens body without substantially interfering with the optical zone function of the lens body.

  Excerpt(s): This application claims the benefit of U.S. Provisional Application 60/221,575, filed Jul. 28, 2000 and entitled CONTACT LENSES WITH MICROCHANNELS.... The present invention generally relates to contact lenses and more specifically relates to contact lenses having microchannels that promote effective tear fluid exchange.... It has long been recognized that extended wear of contact lenses can lead to corneal complications. Adverse corneal responses to extended contact lens wear are believed to be primarily caused by accumulation of debris trapped at the lens-eye interface.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Disinfecting and cleaning system for contact lenses**

  Inventor(s): Sills, Marzenna Alicja; (Norcross, GA), McKee, Mary Mowrey; (Alpharetta, GA)

  Correspondence: THOMAS HOXIE; NOVARTIS, PATENT AND TRADEMARK DEPARTMENT; ONE HEALTH PLAZA 430/2; EAST HANOVER; NJ; 07936-1080; US

  Patent Application Number: 20030118472

  Date filed: July 31, 2002

  Abstract: A system and a method for disinfecting and cleaning ophthalmic devices such as contact lenses is provided. The system involves the use of an active microbicidal solution generated just prior to use by the reaction of an iodide salt with hydrogen peroxide in the presence of a peroxidase. Such a system is particularly useful for disinfecting contact lenses.

  Excerpt(s): This invention relates generally to disinfection and cleaning systems for medical devices. In a preferred embodiment, the invention relates to compositions, methods and articles for disinfecting contact lenses.... Contact lenses are known to accumulate dirt, proteinaceous matter, and microorganisms all of which can affect the health of the eye if allowed to accumulate on the lens. Therefore, the lenses must be cleaned and disinfected regularly and preferably daily. To this end, cleaning and disinfecting solutions for use in conjunction with contact lenses have been in use essentially as long as contact lenses have been available to the public. There is considerable diversity in the makeup of the various known solutions, primarily due to the fact that to date no single solution has been found to meet all of the parameters desired for the various types of lenses.... Furthermore, proteins, lipids, and other

irritating deposits are not always sufficiently removed by disinfection alone and the lens should be cleaned and rinsed beforehand. This is typically performed by wetting the lens with a sufficient amount of a lens cleaner (such as CIBA Vision.RTM. MiraFlow.RTM.) and then rubbing the lens with one's fingers and rinsing the lens with saline. The cleaning step is considered a hassle by some consumers and a disinfection system that adequately disinfects and cleans without this step (a "no rub-no rinse" regimen) would offer a great improvement in convenience to the user.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Fluorocarbon-sulfone hydrophilic contact lenses, optical medical devices and compositions thereof**

  Inventor(s): Novicky, Nick; (Calgary, CA)

  Correspondence: STEVENS, DAVIS, MILLER & MOSHER, L.L.P. Suite 850; 1615 L Street, N.W. Washington; DE; 20036; US

  Patent Application Number: 20030027886

  Date filed: July 5, 2001

  Abstract: Highly comfortable hydrophilic contact lenses are made from a coploymer of an ethylenically unsaturated fluoro-sulfone ester, ethylenically unsaturated fluorosulfone ester monomer of acrylic or methacrylic acid having alkyl hydroxy group and N-Vinyl 2-pyrrolidinone and methods for the manufacturing thereof.

  Excerpt(s): The present invention relates to novel formulation of monomers, to produce polymers for the purpose of manufacturing hydrophilic contact lenses and other optical devices, including optical medical devices. In particular, one important use of the materials made from the invention is the manufacture of corneal contact lenses.... In recent years, hydrophilic corneal contact lenses have become more and more popular in the United States, Canada and throughout the world. In an attempt to create contact lenses which are comfortable and oxygen permeable and essentially clean from deposits it requires incorporation of a longer fluorocarbon chain component in order to make the surface of the lens slick, permitting easy movement on the eye without any friction, and wettable to accomplish necessary comfort for the patient.... Previous hydrophilic contact lenses are based on 2-hydroxyethyl methacrylate (HEMA) or derivatives thereof which produce reasonable comfort to the patient while they are clean; however, when worn for a longer period of time they have a tendency to accumulate deposits or debris on the surface of the lens and then require constant cleaning or in other cases become disposable, that patient has to dispose of contact lenses and get new ones.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **High osmolyte cleaning and disinfection method and solution for contact lenses**

  Inventor(s): Soltys-Robitaille, Christine E. (Rochester, NY), Xia, Erning; (Penfield, NY), Simpson, Lisa C. (Rochester, NY)

  Correspondence: Robert B. Furr, Jr. Law Department; Bausch & Lomb Incorporated; One Bausch & Lomb Place; Rochester; NY; 14604; US

  Patent Application Number: 20020004466

  Date filed: February 13, 2001

Abstract: Contact lens cleaning compositions comprising preserved surfactant-containing solutions of a poly(oxypropylene)-poly(oxyethylene) adduct of ethylene diamine having a molecular weight from about 7500 to as high as 27,000 wherein at least 40 weight percent of the adduct is poly(oxyethylene) hydrophilic units. The solutions are effective in removing protein/lipid tear film deposits on both hard and soft contact lenses while providing a prophylactic-like action in retarding the formation of subsequent tear film deposits. The compositions provide effective cleaning and conditioning action using both ambient and high temperature disinfection methods.

Excerpt(s): This invention relates generally to improved contact lens cleaning and conditioning solutions for removing and inhibiting build-up of tear film deposits and debris on lens surfaces.... In addition to the foregoing, the solutions of the present invention have improved versatility in being adaptable for most contact lens cleaning processes ranging from room temperature cleaning to high temperature disinfecting without adversely affecting the physical characteristics of the lenses.... When contact lenses are removed from the eyes, they lose water and retain on their surface a deposit or proteinaceous oily and sebaceous matter that, if not removed, greatly reduces wettability properties and optical clarity of the lenses. In the case of hard contact lenses fabricated from poly(methyl methacrylate), they are of such firmness the lenses can be treated with mechanical devices to remove deposits of contamination from their surfaces. Likewise, because hard contact lenses do not absorb appreciable amounts of water, the selection of cleaning agents is relatively non-critical. In many instances, use of even harsh disinfecting and cleaning agents on hard contact lenses does not create a problem.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Ink-jet printing system for printing colored images on contact lenses**

Inventor(s): Hyink, David; (Elmhurst, IL), Tucker, Robert Carey; (Arlington Heights, IL)

Correspondence: THOMAS HOXIE; NOVARTIS, PATENT AND TRADEMARK DEPARTMENT; ONE HEALTH PLAZA 430/2; EAST HANOVER; NJ; 07936-1080; US

Patent Application Number: 20030085934

Date filed: November 4, 2002

Abstract: The present invention provides a method for making colored contact lenses and an apparatus for implementing the method of the invention. The apparatus of the invention comprises a securing means for holding a contact lens or a portion of a mold for making the contact lens, a printer head, wherein the printer head comprises one or more nozzles each of which is capable of jetting droplets of color liquid independent of each other under control of a computer system; a positioning means for precisely positioning the printer head at each of a plurality of predetermined positions, one at a time, on a surface of the contact lens or the mold portion under control of the computer system. The method and apparatus of the invention are useful for producing colored contact lenses having high quality color images thereon.

Excerpt(s): The present invention generally relates to systems and methods for making colored contact lenses. More specifically, the present invention relates to a digital printing system for printing a color image on curved surfaces of contact lenses or molds for making contact lenses. In addition, the present invention provides a manufacturing system and method for printing color images on curved surfaces of contact lenses or molds for making contact lenses.... For cosmetic purposes, contact lenses having one or

more colorants dispersed in the lens or printed on the lens are in high demand. These colored contact lenses enhance the natural beauty of the eye, or provide unique patterns on the iris of the wearer, or provide non cosmetic patterns or marks, such as rotation marks, inversion marks, product/brand codes, lot numbers, "DEMO" lenses, and the like, which are of benefits to wearers, eye-care practitioners and manufacturers.... Presently, methods of printing inks onto contact lenses involve clich ink transfer printing. A typical example of this printing follows. An image is etched into metal to form a clich. The clich is placed in a printer. Once in the printer, the clich is inked by either an open inkwell doctoring system or by a closed ink cup sliding across the image. Then, a silicone pad picks up the inked image from the clich and transfers the image to the contact lens. The silicone pads are made of a material comprising silicon that can vary in elasticity. The properties of the silicone material permit the inks to stick to the pad temporarily and fully release from the pad when it contacts the contact lens.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Lens molds with protective coatings for production of contact lenses and other ophthalmic products**

  Inventor(s): Huang, Horngyih; (Penfield, NY), Ruscio, Dominic V. (Webster, NY), Li, Hongwen; (Palo Alto, CA), Lai, Yu Chin; (Pittsford, NY)

  Correspondence: Bausch & Lomb Incorporated; One Bausch & Lomb Place; Rochester; NY; 14604-2701; US

  Patent Application Number: 20030164562

  Date filed: March 12, 2003

  Abstract: This invention relates to the preparation of molds for the production of contact lenses and other ophthalmic articles. By using an inorganic material to coat the optical surfaces and sidewalls of mold parts made from clear-resin materials, manufacturers can produce lens molds with greater dimensional stability and chemical resistance. In addition to protecting the clear resin from interaction with otherwise reactive monomers from which the molded article is made, such coatings can also be used to achieve preferential release of the molded article. The resulting mold is especially useful for providing an economical way to improve manufacturing quality of contact lenses.

  Excerpt(s): This invention is directed to improved lens molds for the production of contact lenses, intraocular lenses, and other ophthalmic products. In particular, the invention involves protective coatings for allowing for the use of mold materials having improved dimensional stability and/or increased light transparency. The invention is also directed to a method of making the improved lens molds and their use in the manufacture of contact lenses.... The molds used in the manufacture of soft (hydrogel) contact lenses have been made from a variety of rigid thermoplastic resins. For example, U.S. Pat. No. 5,540,410 to Lust et al and U.S. Pat. No. 5,674,557 to Widman et al. disclose mold halves made from polystyrene, polyvinyl chloride, polyethylene, polypropylene, copolymers of polystyrene with acrylonitrile and/or butadiene, acrylates such as polymethyl methacrylate, polyacrylontrile, polycarbonate, polyamides such as nylons, polyesters, polyolefins such as polyethylene, polypropylene and copolymers thereof, polyacetal resins, polyacrylethers, polyarylether sulfones, and various fluorinated materials such as fluorinated ethylene propylene copolymers and ethylene fluoroethylene copolymers. Polystyrene is preferred by Widman et al because it does not crystallize and has low shrinkage. An earlier patent, U.S. Pat. No. 4,661,573 to Ratkowski et al, discloses, for the processing of fluorosilicone copolymers into extended

wear lenses, molds formed of polypropylene, polyethylene, nylon, Teflon.RTM., glass, or aluminum having its mold surfaces coated with Teflon.RTM. polymer.... The manufacturers of soft contact lenses have discovered that if the molds used to make the lenses are sufficiently inexpensive, it is more economical to discard the molds after production of the lenses from the molds than it is to clean the molds to be reused. Polypropylene is a good example of an inexpensive resin that has been used to make molds that can be discarded at minimal cost. Another advantage of polypropylene is that unlike many resins, polypropylene can resist interaction with the monomers used to make the contact lenses. The ability to resist chemical interaction prevents the lens and the mold from adhering to each other and simplifies their separation following lens production.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Materials for contact lenses comprising a macromer having the polysiloxane structure in the side chain**

  Inventor(s): Imafuku, Suguru; (Tokyo, JP)

  Correspondence: JACOBSON, PRICE, HOLMAN & STERN, PLLC; PROFESSIONAL LIMITED LIABILITY COMPANY; THE JENIFER BUILDING; 400 SEVENTH STREET, N.W. WASHINGTON; DC; 20004; US

  Patent Application Number: 20020005933

  Date filed: February 23, 2001

  Abstract: A material for contact lenses having excellent flexibility and oxygen permeability are disclosed. The material comprises a copolymer essentially comprising a siloxane macromer of component (A) which has the number-average molecular weight of from about 1,000 to 10,000 and is represented by the general formula (I), a water-insoluble monoolefin monomer of component (B), and a water-soluble monoolefin monomer of component (C). A soft contact lens which is obtained by injecting to a mold in the shape of contact lens the components (A), (B) and (C); copolymerizing the monomer mixture; and making the resulting copolymer contain water. 1

  Excerpt(s): The present invention relates to a material for contact lenses which is suitable as a polymer having biocompatibility and oxygen permeability, and to soft contact lenses. The soft contact lenses of the present invention have the water content of, for example, from 15 to 35%, and excellent flexibility and oxygen permeability.... Clinical results have indicated that a use of contact lenses reduces the supply of oxygen from the air, which may sometimes cause inhibiting proliferation of corneal epithelial cells and corneal swelling. Accordingly, an improvement of the material in oxygen permeability has been attempted so far in order to provide contact lenses having higher safety.... In the improvement in oxygen permeability of hard contact lenses, introduction of siloxanyl methacrylate, fluoroalkyl methacrylate or the like has been attempted. This method remarkably improved oxygen permeability of hard contact lenses; however, the aggravation of the feel in use caused by the hard material has not be improved at all. On the other hand, soft contact lenses are categorized into no-water-containing soft contact lenses and water-containing (hydrogel) lenses. As for the no-water-containing soft contact lenses, silicone lenses, for example, have high oxygen permeability; however, too much elasticity causes lenses to stick to the cornea, and accordingly, they have not been practically utilized. Lenses made of (meth)acrylic esters have a rather low oxygen permeability constant, which is an insufficient value. The water-containing soft contact lenses are known to be comfortable in use due to flexibility of the material; however,

their oxygen permeability is derived from the water content of the lenses, and thereby lower compared with that of hard contact lenses. For example, a material for water-containing soft lenses having the water content of 80% has the oxygen permeability constant of about 40.times.10.sup.-11 (cm.sup.2/sec).multidot.(mL O.sub.2/mL.times.mmHg).

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Method and composition for cleaning and disinfecting contact lenses**

  Inventor(s): Minno, George E. (Victor, NY), Proud, David W. (Rochester, NY), Mowrey-McKee, Mary F. (Victor, NY)

  Correspondence: Bausch & Lomb Incorporated; Law Department; One Bausch & Lomb Place; Rochester; NY; 14604-2701; US

  Patent Application Number: 20030125221

  Date filed: November 5, 2002

  Abstract: Contact lenses are simultaneously cleaned and disinfected by contacting the lenses with an aqueous system containing an antimicrobial agent and a proteolytic enzyme for a period sufficient to clean and disinfect the lenses. The aqueous solutions have suitable osmotic values which do not substantially inhibit the activity of the antimicrobial agent.

  Excerpt(s): This application is a continuation-in-part of U.S. application Ser. No. 313,643 filed Feb. 21, 1989.... This invention relates to a method for cleaning and disinfecting contact lenses and a composition for the same. More specifically, the present invention is directed to a method for simultaneously cleaning and disinfecting contact lenses by contacting the lenses with an aqueous system containing an antimicrobial agent and a proteolytic enzyme. A composition for simultaneously cleaning and disinfecting the lenses is also provided.... In the normal course of wearing contact lenses, tear film and debris consisting of proteinaceous, oily, sebaceous, and related organic matter have a tendency to deposit and build up on lens surfaces. As part of the routine care regimen, contact lenses must be cleaned to remove these tear film deposits and debris. If these deposits are not properly removed, both the wettability and optical clarity of the lenses is substantially reduced causing discomfort for the wearer.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Method for cast moulding contact lenses with a rounded edge form**

  Inventor(s): Dean, Gregg A. (Hampshire, GB)

  Correspondence: Frank J. Uxa; Stout, Uxa, Buyan & Mullins, LLP; Suite 300; 4 Venture; Irvine; CA; 92618; US

  Patent Application Number: 20020196411

  Date filed: June 14, 2002

  Abstract: Methods for producing contact lenses include providing a back surface tool having a surface generally corresponding to a desired contact lens surface and a convex curve along an outer radius thereof, positioning the tool in a molding apparatus, introducing a moldable material into the molding apparatus to form a first mold section having a negative impression of the surface of the tool, assembling the first mold section

with a second mold section to form a lens shaped cavity therebetween and forming a contact lens member in the lens shaped cavity of the assembled mold sections. Molds useful in producing contact lenses, tools useful in making mold sections for molding contact lenses and contact lenses having rounded edge surfaces are also provided.

Excerpt(s): The present invention generally relates to the manufacture of contact lenses and more specifically relates to methods for cast molding contact lens with a molded edge that requires no dedicated post-processing steps.... Contact lenses have historically been made by machining a lens material, in button (or block) form on front and back surfaces thereof to produce an unfinished lens product having the required fit, or "base curve", and visual correction, to compensate for one or more refractive abnormalities of the eye. Such refractive abnormalities may include myopia (nearsightedness), hypermetropia (farsightedness), astigmatism, presbyopia and the like. Using conventional machining technology, the optic faces of the unfinished lens require polishing in order to remove rings, known as "turning rings", on the unfinished lens that have been created by the machining process. Typically the edge of the lens is also polished to produce smooth edge geometry, or profile, in order to maximize wearer comfort and prevent injury to the eye. The edge polishing step is particularly important in the manufacture of "hard" lenses, in which the lens material is relatively rigid and inflexible and even small defects on the edge can cause irritation in the wearers' eye.... The machining process described above, being very labor intensive, has been widely replaced by cast molding of the lens. In conventional cast molding techniques, front and back surface mold halves are made for the required lens prescription. Each mold section is produced by injection molding techniques. A mold insert tool, for example made of metal, ceramic or the like, is provided and secured or fixed in an injection molding machine. A mold section, or mold half, is then produced having the contour of the insert. Thus, the mold section may include a negative impression of, or a contour which corresponds to, the desired lens front or back surface.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Method for molding contact lenses**

  Inventor(s): Dean, Gregg A. (Hampshire, GB)

  Correspondence: Frank J. Uxa; Stout, Uxa, Buyan & Mullins, LLP; Suite 300; 4 Venture; Irvine; CA; 92618; US

  Patent Application Number: 20020056801

  Date filed: November 9, 2001

  Abstract: Methods of cast molding toric contact lenses are provided including the steps of providing a first contact lens mold section; providing a molding apparatus and an insert tool adapted to be fixed to the molding apparatus at a plurality of different rotational orientations relative to the molding apparatus; fixing, at one of a plurality of different rotational orientations relative to the molding apparatus, the insert tool in a molding apparatus and producing a second mold section in the molding apparatus with the insert tool fixed thereto, wherein the second mold section includes a contour which corresponds to a toric optical zone of a contact lens; assembling the first and second mold sections; and cast molding a toric contact lens product between the mold sections. Sets of mold sections useful for molding toric contact lenses as provided.

  Excerpt(s): This application claims benefit of Provisional Application Serial No. 60/169,753 filed Dec. 9, 1999, the disclosure of which is incorporated in its entirety

herein by reference.... The present invention generally relates to the manufacture of contact lenses and more specifically relates to methods for cast molding toric contact lenses with a toric optical zone on a surface, for example, on a posterior surface, and preferably a spherical correction on a surface, for example, on an anterior surface.... Contact lenses having a toric optical zone (commonly referred to as "toric contact lenses") are commonly used to correct refractive abnormalities of the eye relating to astigmatism. Astigmatism may be associated with other refractive abnormalities, such as myopia (nearsightedness), and hypermetropia (farsightedness), presbyopia and the like and therefor toric contact lenses can be prescribed with one or more spherical corrections. Both back toric lenses (having a toric surface formed in the posterior lens surface) and front toric lenses (having a toric surface formed in the anterior lens surface) are presently available.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Multifocal corneal contact lenses**

  Inventor(s): Seidner, Leonard; (Hawley, PA)

  Correspondence: COLEMAN SUDOL SAPONE, P.C. 714 COLORADO AVENUE; BRIDGE PORT; CT; 06605-1601; US

  Patent Application Number: 20030043342

  Date filed: December 28, 2000

  Abstract: In a pair of multifocal contact lenses for a patient, each lens has a concave posterior surface and a convex anterior surface. The anterior surface is formed with a power curve including a circular intermediate vision correction zone, an annular near vision correction zone contiguous with the circular central zone, and an annular distant vision correction zone contiguous with the near vision correction zone. The near vision correction zone and the distant vision correction zone are concentric or coaxial with the circular central correction zone.

  Excerpt(s): This application relies for priority purposes on U.S. provisional application No. 60/176,787 filed Jan. 18, 2000.... This invention relates to a multifocal contact lens. More particularly, this invention relates to paired multifocal contact lenses.... Bifocal contact lenses are designed to correct or compensate for a condition of advancing age known as "presbyopia." In a presbyopic eye, the ability to focus at near distances, such as the normal reading distance, and in some cases at intermediate distances, is diminished. The loss of focusing capability is due to hardening of the eye's natural crystalline lens material.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Myopia progression control using bifocal contact lenses**

  Inventor(s): Aller, Thomas A. (Albany, CA)

  Correspondence: TOWNSEND AND TOWNSEND AND CREW, LLP; TWO EMBARCADERO CENTER; EIGHTH FLOOR; SAN FRANCISCO; CA; 94111-3834; US

  Patent Application Number: 20030058407

  Date filed: May 23, 2002

Abstract: The present invention provides new methods and systems for treating myopia progression in myopic patients who also exhibit near point esophoria, esophoria at near, eso fixation disparity, or eso associated phoria by selectively prescribing bifocal contact lenses to such patients. Near point eso fixation disparity may include esophores, low exophores, and orthophores. One method for controlling myopia progression comprises identifying a near point esophoric myopic patient, measuring an amount of fixation disparity, and prescribing a bifocal contact lens add power prescription. The bifocal add power prescription is based on the fixation disparity measurement and a distance prescription for the patient's eye.

Excerpt(s): The present application is a non-provisional patent application and claims the benefit of priority from U.S. Provisional Application No. 60/304,912, filed Jul. 11, 2001, the full disclosure of which is incorporated herein by reference.... The present invention relates generally to methods and systems for the treatment of myopia progression. In particular, the present invention relates to methods and systems for treating myopia progression in myopic patients who also exhibit near point esophoria, esophoria at near, eso fixation disparity, and/or eso associated phoria.... Myopia, also known as nearsightedness, is a visual defect in which distant objects appear blurred because their images are focused in front of the retina rather than on it causing a retinal blur. Myopia is one of the more prevalent human visual disorders, affecting up to 25% of American adults, with associated cost of correction and management having been estimated at several billion dollars per year. In some regions of the world, up to 75% of people may have myopia. Moreover, the prevalence of myopia may even be increasing. In some instances, high levels of myopia may result in grave consequences, such as, blindness from retinal detachment, myopic macular degeneration, cataract, glaucoma, or severe side effects or complications from myopia correction. Thus, treatments which control, reduce, inhibit, or even reverse myopia progression would have a widespread benefit.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Ophthalmic anti-allergy compositions suitable for use with contact lenses**

  Inventor(s): Yanni, John M. (Burleson, TX)

  Correspondence: ALCON RESEARCH, LTD. R&D COUNSEL, Q-148; 6201 SOUTH FREEWAY; FORT WORTH; TX; 76134-2099; US

  Patent Application Number: 20010056093

  Date filed: January 24, 2001

  Abstract: Topically administrable anti-allergy compositions comprising olopatadine and a polymeric quaternary ammonium preservative are suitable for use by patients wearing contact lenses.

  Excerpt(s): This application claims priority to co-pending U.S. Provisional Application, U.S. Serial No. 60/177,804 filed Jan. 25, 2000.... The present invention relates generally to ophthalmic anti-allergy compositions. In particular, the present invention relates to topical anti-allergy compositions that can be safely applied by a patient wearing contact lenses.... Ophthalmic formulations generally contain one or more active compounds along with excipients such as surfactants, comforting agents, complexing agents, stabilizers, buffering systems, chelating agents, viscosity agents or gelling polymers and anti-oxidants. Ophthalmic formulations which are intended for multidose use require a

preservative. Benzalkonium chloride ("BAC") is the most widely used ophthalmic preservative.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Package and a case for contact lenses and method for applying a contact lens in an eye**

  Inventor(s): Faxe, Thomas; (Dronning Molle, DK), Faxe, Per; (Hornbaek, DK)

  Correspondence: WINSTON & STRAWN; 200 PARK AVENUE; NEW YORK; NY; 10166-4193; US

  Patent Application Number: 20020063068

  Date filed: January 22, 2002

  Abstract: A magazine for keeping a number of contact lenses kept in each their fluid-filled chamber is disclsoed. Each chamber has a supporting wall with a concave face fitting the convex side of the contact lens. The supporting walls are placed in a row along the axis of the concave faces, each supporting wall is detachably separating consecutive chambers. The magazine contains several contact lenses at a time and constitutes an inexpensive and expedient package. When a contact lens is applied in an eye, the magazine is placed with the skirts pointing downwards. The lowest support is then removed from the rest of the magazine with a finger stuck into the skirt of the supporting wall. Due to the moisture present, the contact lens is adhering to the supporting wall which together with its skirt is now transformed into an effective applicator for applying a contact lens in an eye.

  Excerpt(s): This application is a continuation of the national stage of PCT Application No. PCT/DK00/00409, filed Jul. 18, 2000, the content of which is expressly incorporated herein by reference thereto.... The invention relates to a magazine for keeping a number of contact lenses and of the kind where the contact lenses are kept in each their fluid-filled chamber, each chamber having a supporting wall with a concave face fitting the convex side of the contact lens, the supporting walls are placed in a row after each other along the axis of the concave faces, each supporting wall detachably separating two consecutive chambers, and each chamber made with a convex face a distance above the concave face.... There are different packages for contact lenses. In a common kind, a chamber for a contact lens is made in a thin sheet of plastic. The chamber is furthermore filled with a saline solution and sealed by means of a sealing foil of coated aluminium. When the contact lens is to be used, the sealing foil is pulled off the chamber sheet, and the contact lens is poured out into the hand together with the saline solution, the lens is turned over and placed on the tip of a finger which is then used for applying the contact lens in an eye.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Photochromic contact lenses and methods of manufacturing**

  Inventor(s): Mallak, Frank P. (Export, PA), Walters, Robert W. (Export, PA), Kumar, Anil; (Pittsburgh, PA), Gemert, Barry Van; (Murrysville, PA)

  Correspondence: Frank P. Mallak, PA; PPG Industries, Inc. One PPG Place; Pittsburgh; PA; 15272; US

  Patent Application Number: 20030142267

  Date filed: December 10, 2002

  Abstract: Described are contact lenses having photochromic materials within the central or pupillary area of the lens and methods for manufacturing such lenses. In one method, a photochromic amount of at least one photochromic material is added to the pupillary region of a casting mold containing a polymerizable monomer that can be at least partially cured before and/or after the addition. Another method involves providing an amount of polymerizable photochromic monomer for the pupillary region and an amount of polymerizable non-photochromic monomer for the remainder of the contact lens in a casting mold. The photochromic and non-photochromic monomers can differ by their degree of polymerization, viscosity and/or density.

  Excerpt(s): This application claims priority to provisional application Serial No. 60/340,047 filed on Dec. 10, 2001.... The present invention relates to light sensitive photochromic contact lenses and methods for manufacturing. More particularly, the invention relates to contact lenses having light sensitive substances such as photochromic materials located within the central portion or pupillary region of the lens. The methods for manufacturing are applicable, in one non-limiting embodiment, to the cast molding method of producing contact lenses.... Photochromism is a phenomenon involving a light induced reversible change in color. An article containing such a material that becomes colored upon exposure to light radiation containing ultraviolet rays will revert to the original color when the influence of the ultraviolet radiation is discontinued. Sources of light radiation that contain ultraviolet rays include, for example, sunlight and the light of a mercury lamp. Discontinuation of the ultraviolet radiation can be achieved for example by storing the photochromic material or article in the dark or by removing the source of ultraviolet radiation (e.g., by means of filtering).

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Polymeric materials for making contact lenses**

  Inventor(s): Schremmer, Jacalyn Mary; (Atlanta, GA), Nicolson, Paul Clement; (Dunwoody, GA), Lally, John Martin; (Lilburn, GA), Winterton, Lynn Cook; (Alpharetta, GA), Aguado, Celeste; (Atlanta, GA), Qiu, Yongxing; (Duluth, GA)

  Correspondence: THOMAS HOXIE; NOVARTIS CORPORATION; PATENT AND TRADEMARK DEPT; 564 MORRIS AVENUE; SUMMIT; NJ; 079011027

  Patent Application Number: 20030008154

  Date filed: May 22, 2002

  Abstract: An ophthalmic lens suited for extended-wear periods of at least one day on the eye without a clinically significant amount of corneal swelling and without substantial wearer discomfort. The lens has a balance of oxygen permeability and ion or water permeability, with the ion or water permeability being sufficient to provide good on-eye movement, such that a good tear exchange occurs between the lens and the eye. A

preferred lens is a copolymerization product of a oxyperm macromer and an ionoperm monomer. The invention encompasses extended wear contact lenses, which include a core having oxygen transmission and ion transmission pathways extending from the inner surface to the outer surface.

Excerpt(s): This invention relates broadly to lenses and polymeric materials useful in optic and ophthalmic arts. More specifically, this invention relates to a polymer composition useful in the manufacture of contact lenses. Still more specifically, this invention relates to contact lenses useful as extended-wear contact lenses.... In recent years, a wide variety of research has been carried out to develop polymeric materials useful for making extended-wear contact lenses which affect minimally corneal health and give wearers maximal comfort. Ideally, extended-wear contact lenses would display high oxygen permeability, high ion permeability, good wettability, adequate on-eye movement, and tear exchange, all of which are required to maintain corneal health and wear comfort.... There have been many attempts to prepare different polymers having different properties to make extended-wear lenses having some of the above-mentioned desired properties. For example, see U.S. Pat. Nos. 3,808,178; 4,136,250; and 5,070,169 and especially PCT publication WO9631792. In WO9631792, Nicolson et al. teaches a process and polymer composition for making extended-wear lenses having an oxygen transmissibility of at least 70 barrers/mm; an ion permeability characterized either by (1) an Ionoton Ion Permeability Coefficient of greater than about 0.2.times.10.sup.-6 cm.sup.2/sec or (2) an Ionoflux Diffusion Coefficient of greater than about 1.5.times.10.sup.-6 cm.sup.2/min. Extensive research is still carried out with the aim of developing new materials that are suitable for making extended-wear lenses that have minimal adverse effects on corneal health and wearer comfort.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Polysaccharide coating of contact lenses**

  Inventor(s): Galin, Miles A. (New York, NY)

  Correspondence: BAKER & BOTTS, L.L.P. 30 ROCKEFELLER PLAZA; NEW YORK; NY; 10112; US

  Patent Application Number: 20020057417

  Date filed: December 26, 2001

  Abstract: The present invention provides a method of modifying surfaces of contact lenses to reduce bacterial, fungal or viral concentration and adherence. The method of the invention comprises the coating of a contact lens surface with a sulfated polysaccharide such as heparin to reduce the concentration of microorganisms, as well as bacterial, fungal or viral adherence. The invention further relates to compositions comprising contact lenses for correcting vision deficiencies of the eye coated with a sulfated polysaccharide such as heparin. Contact lens surfaces as provided in accordance with this invention have a coating of sulfated polysaccharide which reduces the concentration of microorganisms of all types and prevents the adherence of bacteria, fungi or viruses to the lens surface thereby reducing the potential for infection.

  Excerpt(s): The present invention provides a method of modifying the surface of contact lenses to reduce bacterial, fungal or viral adherence and presence. The method of the invention comprises the coating of a contact lens surface with a sulfated polysaccharide such as heparin to reduce the concentration of microbiological flora as well as the level of bacterial, fungal or viral adherence. The invention further relates to compositions

comprising contact lenses for correcting vision deficiencies of the eye coated with a sulfated polysaccharide such as heparin. Contact lens surfaces as provided in accordance with this invention have a coating of sulfated polysaccharide which reduces the adjacent microbiological flora and prevents the adherence of bacteria, fungi or viruses to the lens surface thereby reducing the potential for infection.... Eye care products, such as contact lenses, are susceptible to contamination by ocular pathogens. Such pathogens, including bacteria, fungi, protozoans and viruses, have been found to cause diseases of the eye including infectious keratitis, conjunctivitus and uveitis. Of the approximately 20 million contact lens wearers in the United States, over 12,000 infections are estimated to occur yearly. Thus, wearing of contact lenses poses a risk of serious, painful complications, including corneal ulceration from infection, which can lead to blindness.... Various agents have been found to be effective in killing or reducing the growth of pathogens. For example, U.S. Pat. No. 4,499,077 discloses an antimicrobial composition for treatment of soft contact lenses comprising an oxidizing agent such as an oxyhalogen compound; and U.S. Pat. No. 4,654,208 discloses an antimicrobial composition for contact lenses including a germicidal polymeric nitrogen compound. In addition, contact lenses may be manufactured to incorporated specific compounds having antimicrobial activities into the lens material. For example, U.S. Pat. No. 5,770,637 discloses contact lenses prepared from polymers that contain metal chelators that make such metals unavailable to pathogens such as bacteria.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Product for cleaning and disinfecting contact lenses without rubbing**

  Inventor(s): Rosenthal, Ruth Ann; (Alvarado, TX), Chowhan, Masood A. (Arlington, TX), Stone, Ralph P. (Fort Worth, TX)

  Correspondence: ALCON RESEARCH, LTD. R&D COUNSEL, Q-148; 6201 SOUTH FREEWAY; FORT WORTH; TX; 76134-2099; US

  Patent Application Number: 20030040446

  Date filed: August 5, 2002

  Abstract: An improved, simplified process for cleaning and disinfecting contact lenses is described. The process employs a multi-purpose solution containing a non-oxidative antimicrobial agents, and does not include or require rubbing of the lenses.

  Excerpt(s): Pursuant to 35 U.S.C..sctn.120, The present application is a continuation of U.S. patent application Ser. No. 09/885,637 filed Jun. 20, 2001, which claims priority from U.S. Provisional Application Serial No. 60/221,797 filed Jul. 31, 2000.... The present invention is directed to processes for cleaning and disinfecting contact lenses. More particularly, the invention is directed to an improved, simplified process for cleaning and disinfecting contact lenses that does not require a rubbing step.... Prior to the advent of multi-purpose solutions, the "regimens" for cleaning and disinfecting contact lenses required the use of several different products and were fairly complicated. For example, a typical multi-product regimen may have included: (1) a daily cleaner product, which typically contained a surfactant and possibly other cleaning agents (e.g., microscopic polymeric beads); (2) a soaking solution, which was generally used to disinfect the contact lenses; (3) a saline solution, which was generally used to rinse the lenses following use of the daily cleaner product or at various other stages of the cleaning and disinfecting regimen; (4) an enzymatic cleaner product for removing protein deposits, either daily or weekly; and (5) rewetting drops and/or comfort drops, which were generally used to rehydrate or moisten the lenses as needed.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Rotationally stabilized contact lenses**

  Inventor(s): Washington, Alex T. (Jacksonville, FL), Collins, Michael J. (Mt. Nebo, AU), Davis, Brett A. (Cooparoo, AU), Newman, Steven; (New Farm, AU), Roffman, Jeffrey H. (Jacksonville, FL)

  Correspondence: AUDLEY A. CIAMPORCERO JR. JOHNSON & JOHNSON; ONE JOHNSON & JOHNSON PLAZA; NEW BRUNSWICK; NJ; 08933-7003; US

  Patent Application Number: 20020024631

  Date filed: July 9, 2001

  Abstract: The invention provides contact lenses that incorporate a coaxial stabilization zone to stabilize the orientation of the lens in relation to the eye.

  Excerpt(s): The invention relates to contact lenses. In particular, the invention provides contact lenses that incorporate a coaxial stabilization zone to stabilize the orientation of the lens in relation to the eye.... It is known that the correction of certain optical defects can be accomplished by imparting non-spherical corrective characteristics into a contact lens, such as cylindrical, bifocal, or multifocal characteristics. Additionally, advances in technology permit production of customized lenses or lenses based on an individual's corneal topographic measurements, wave front measurements, or both. The use of customized contact lenses or lenses with certain corrective characteristics may be problematic in that the lens may need to be maintained at a specific orientation while on the eye to be effective. However, the lenses will rotate on the eye due to blinking as well as eyelid and tear fluid movement.... Lenses designed to maintain their on-eye orientation typically are of two general types. One type uses prism stabilization, or thickening of certain lens portions, to maintain orientation. Examples of prism stabilization methods include decentering the front relative to the back lens surface, prismatic balancing, thickening of the lower lens edge, supporting the lens on the lower eyelid, forming depressions or elevations on the lens' surface, and truncating the lens edge.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Simplified process for cleaning and disinfecting contact lenses with a single solution**

  Inventor(s): Chowhan, Masood A. (Arlington, TX), Rosenthal, Ruth Ann; (Alvarado, TX), Stone, Ralph P. (Fort Worth, TX)

  Correspondence: ALCON RESEARCH, LTD. R&D COUNSEL, Q-148; 6201 SOUTH FREEWAY; FORT WORTH; TX; 76134-2099; US

  Patent Application Number: 20020039975

  Date filed: June 20, 2001

  Abstract: An improved, simplified process for cleaning and disinfecting contact lenses is described. The process employs a multi-purpose solution containing a non-oxidative antimicrobial agents, and does not include or require rubbing of the lenses.

  Excerpt(s): Pursuant to 35 U.S.C..sctn. 120, Applicants hereby claim priority based on Provisional Application Ser. No. 60/221,797.... The present invention is directed to processes for cleaning and disinfecting contact lenses. More particularly, the invention is

directed to an improved, simplified process for cleaning and disinfecting contact lenses that does not require a rubbing step.... Prior to the advent of multi-purpose solutions, the "regimens" for cleaning and disinfecting contact lenses required the use of several different products and were fairly complicated. For example, a typical multi-product regimen may have included: (1) a daily cleaner product, which typically contained a surfactant and possibly other cleaning agents (e.g., microscopic polymeric beads); (2) a soaking solution, which was generally used to disinfect the contact lenses; (3) a saline solution, which was generally used to rinse the lenses following use of the daily cleaner product or at various other stages of the cleaning and disinfecting regimen; (4) an enzymatic cleaner product for removing protein deposits, either daily or weekly; and (5) rewetting drops and/or comfort drops, which were generally used to rehydrate or moisten the lenses as needed.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Solution for contact lenses**

  Inventor(s): Tanikawa, Sadayasu; (Kasugai-shi, JP), Tsuzuki, Akira; (Nagoya-shi, JP)

  Correspondence: OBLON SPIVAK MCCLELLAND MAIER & NEUSTADT PC; FOURTH FLOOR; 1755 JEFFERSON DAVIS HIGHWAY; ARLINGTON; VA; 22202; US

  Patent Application Number: 20020016270

  Date filed: June 13, 2001

  Abstract: A solution for contact lenses which comprises an amino acid type cationic surfactant and at least one nonionic surfactant.

  Excerpt(s): The present invention relates to a solution for contact lenses, particularly a solution for contact lenses having an excellent cleaning effect and having an adequate safety for the eye.... Conventionally, contact lenses have been classified into water-nonabsorptive contact lenses and water-absorptive contact lenses, and classified into hard contact lenses and soft contact lenses. On each of these contact lenses, a stain of e.g. lipids (eye lipids) derived from the tear may be deposited when the lens is put on the eye in some cases, and such a stain on the lens due to the tear may cause deterioration in comfortableness in wearing or eye problems such as failure of eyesight or congestion of cornea, and accordingly it is essential to apply a cleaning treatment to a contact lens in order to safely and comfortably use the contact lens every day.... For such a cleaning treatment of a contact lens, a proper solution for contact lenses having a cleaning or removing effect over a stain is usually used. As such a solution for contact lenses, various solutions having a surfactant as a cleaning component added and incorporated therein have been proposed, and one having a nonionic surfactant such as a polyoxyalkylene block copolymer such as a polyoxyethylene-polyoxypropyl- ene block copolymer or a derivative thereof incorporated may, for example, be known.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Solutions for treating contact lenses**

  Inventor(s): Asgharian, Bahram; (Arlington, TX)

  Correspondence: ALCON RESEARCH, LTD. R&D COUNSEL, Q-148; 6201 SOUTH FREEWAY; FORT WORTH; TX; 76134-2099; US

  Patent Application Number: 20010046973

  Date filed: June 18, 2001

  Abstract: Contact lens care compositions for the treatment of hard contact lenses are disclosed. The compositions are useful for rinsing, cleaning, disinfecting and storing of hard contact lenses. The compositions contain an unique gelling system involving galactomannan polysaccharides and borates to allow for the conditioning of the lens when it is reinserted in the eye of the user. Methods of using these compositions are also disclosed.

  Excerpt(s): The present application is a continuation of a 371 application, Ser. No. 09/242,640 filed Feb. 16, 1999, which claims benefits to PCT/US98/14598 filed Jul. 17, 1998, and Provisional Application No. 60/054,119 filed Jul. 29, 1997.... The present invention relates to contact lens care compositions useful in treating hard contact lenses. The compositions of the present invention involve an unique polymer gelling system comprising a galactomannan polysaccharide and a borate crosslinking compound, which together form a mucin-like soft gel in the presence of increasing pH and ionic strength.... Hard contact lenses are named for their rigidity, and are generally made of polymethyl methacrylate (PMMA), siloxane acrylates, fluoro-siloxane acrylates or fluoro polymers. The most common type of hard contact lenses are the rigid gas permeable ("RGP") lenses, which allow soluble gases contained in natural or artificial tears to pass through it and feed the corneal tissues.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Tinted contact lenses**

  Inventor(s): Hickson-Curran, Sheila; (Ponte Vedra Beach, FL), McCarthy, Karin D. (Ponte Vedra Beach, FL), Chehab, Khaled A. (Jacksonville, FL), Clark, Douglas G. (Jacksonville, FL)

  Correspondence: Philip S. Johnson, Esq. Johnson & Johnson; One Johnson & Johnson Plaza; New Brunswick; NJ; 08933-7003; US

  Patent Application Number: 20020080327

  Date filed: December 22, 2000

  Abstract: The invention provides tinted contact lenses, and methods for their manufacture, that alter the natural color of the lens wearer's iris. The lenses use a base layer of translucent color having a clear central zone and a translucent color zone in combination with one or more layers of translucent color, one or more layers of opaque color, or a combination thereof, each of which additional zones has a clear central zone and a zone of color.

  Excerpt(s): The invention relates to tinted contact lenses. In particular, the invention provides contact lenses that change the natural color of the lens wearer's iris.... The use of tinted, or colored, contact lenses to alter the natural color of the iris is well known. In some of these lenses, translucent color is used which covers the pupil aperture and iris. This minimizes the difference between the high light absorbing iris zone and the pupil

zone. However, this design results in an overall reduction of the light reaching the retina. In other lenses, opaque shapes are used only over the iris permitting a portion of the natural iris to be seen. A disadvantage of these lenses is that the visual filed is restricted, especially under low illumination, by blurring or hazing in the peripheral visual field. Thus, a need exists for a contact lens that alters the natural color of the iris, but that overcomes some of these disadvantages.... The invention provides tinted contact lenses, and methods for their manufacture, that alter the natural color of the lens wearer's iris. The lenses of the invention provide a natural appearing iris and, at the same time, good peripheral and overall vision under all lighting conditions. It is a discovery of the invention that these characteristics can be achieved in a tinted lens by the use of a base layer of translucent color, the base layer having a clear central zone and a translucent color zone, in combination with one or more layers of translucent color, one or more layers of opaque color, or a combination thereof, each of which additional zones has a clear central zone and a zone of color.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Treatment of contact lenses with supercritical fluid**

  Inventor(s): Bawa, Rajan S. (Ft. Worth, TX), Tasber, Frank; (Henrietta, NY), Hahn, Dennis; (Rochester, NY)

  Correspondence: Bausch & Lomb Incorporated; One Bausch & Lomb Place; Rochester; NY; 14604; US

  Patent Application Number: 20010048506

  Date filed: December 29, 2000

  Abstract: A method of treating contact lenses made from polymerizable materials by providing supercritical fluids to the lenses.

  Excerpt(s): This invention relates to improved methods of manufacturing or processing contact lens materials employing a supercritical fluid.... Polymerized contact lens materials must not only have sufficient optical clarity, but also must be suitable for contact with the eye for extended periods. The contact lenses made from such materials must be sufficiently hydrophilic at the lens surface to properly "wet". Wetting is the characteristic understood to relate to the contact lens' ability to be lubricated by the eye's natural tears so that the lens may move freely over the eye during its use. This freedom of movement over the eye keeps the lens from adhering to the eye and allows a continuous stream of tears to wash under and over the lens, resulting in maximum comfort.... The ability of a lens to properly wet and be "comfortable" in the eye is difficult to predict. Much work in the field has been directed to achieving and maintaining a hydrophilic environment on the contact lens surface. Incorporation of a variety of hydrophilic monomers into the monomer mix, as well as post-treatments such as plasma treatments have been attempted, with some success, to maintain hydrophilicity at the lens surface. However, attempts to improve and maintain adequate hydrophilicity must not compromise the other important lens characteristics, such as optical clarity. Conversely, attempts to improve or retain a high degree of optical clarity, oxygen permeability, tear strength, etc., while maintaining the proper modulus, must not adversely affect the lens' wetting capabilities.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Use of microwave energy to disassemble, release, and hydrate contact lenses**

  Inventor(s): Bowen, David; (St. Augustine, FL), Calvin, Olin; (Jacksonville, FL), Albrektson, Philip R. (Cacksonville, FL)

  Correspondence: AUDLEY A. CIAMPORCERO JR. JOHNSON & JOHNSON; ONE JOHNSON & JOHNSON PLAZA; NEW BRUNSWICK; NJ; 08933-7003; US

  Patent Application Number: 20030164563

  Date filed: February 12, 2003

  Abstract: An arrangement and method for using microwave energy to disassemble, release, and hydrate contact lenses in one or more microwave heating and processing stations. Microwave energy is used to promote disassembly of a front curve mold with an adhered HEMA ring from a base curve mold with an adhered contact lens, and microwave energy is also used to promote release of the contact lens from the base curve mold, and microwave energy is further used to facilitate hydration of the released contact lens.

  Excerpt(s): The present invention claims the benefit of U.S. Provisional Patent Application Serial No. 60/361,534, filed on Mar. 4, 2002.... The present invention relates generally to an arrangement and method for using microwave energy to disassemble, release, and hydrate contact lenses, and more particularly pertains to the use of microwave energy in one or more microwave heating and processing stations designed to disassemble, release, and hydrate contact lenses.... The state of the art of manufacturing hydrogel soft contact lenses has progressed to automated molding systems and assembly lines in which each hydrogel soft contact lens is formed by sandwiching a monomer between front and back mold section halves. The monomer is polymerized to form a lens, which is then removed from the mold section halves, further treated and then packaged for consumer use.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Water -soluble antibacterial polymer and liquid formulation comprising it for contact lenses**

  Inventor(s): Oono, Sadanori; (Kasugai-shi, JP), Nakada, Kazuhiko; (Kasugai-shi, JP)

  Correspondence: OBLON SPIVAK MCCLELLAND MAIER & NEUSTADT PC; FOURTH FLOOR; 1755 JEFFERSON DAVIS HIGHWAY; ARLINGTON; VA; 22202; US

  Patent Application Number: 20010016190

  Date filed: January 30, 2001

  Abstract: It is an object of the present invention to provide a water-soluble antibacterial polymer having an excellent antibacterial property and stability, and a liquid formulation comprising it for contact lenses, which is suitably used for disinfection or preservation of contact lenses.A water-soluble antibacterial polymer having repeating units of the formula (I): 1wherein R.sup.1 is a hydrogen atom or a methyl group, R.sup.2 is a C.sub.1-8 alkylene group, R.sup.3 is a C.sub.1-18 alkyl group, and X.sup.1 is a halogen atom, and/or repeating units of the formula (II): 2wherein R.sup.4 is a hydrogen atom or a methyl group, R.sup.5 is a C.sub.1-8 alkylene group, R.sup.6 is a C.sub.1-18 alkyl group, and X.sup.2 is a halogen atom, which is made by polymerization of a polymerizable component comprising a compound (A-1) of the formula (III): 3wherein R.sup.1 is a hydrogen atom or a methyl group, R.sup.2 is a C.sub.1-8 alkylene

group, R.sup.3 is a C.sub.1-18 alkyl group, and X.sup.1 is a halogen atom, and/or a compound (A-2) of the formula (IV): 4wherein R.sup.4 is a hydrogen atom or a methyl group, R.sup.5 is a C.sub.1-8 alkylene group, R.sup.6 is a C.sub.1-18 alkyl group, and X.sup.2 is a halogen atom, wherein the polymerizable component contains at least one hydrophilic monomer copolymerizable with the compound (A-1) and/or the compound (A-2).

Excerpt(s): The present invention relates to a water-soluble antibacterial polymer and a liquid formulation contain in comprising it for contact lenses. More specifically, it relates to a water-soluble antibacterial polymer having antibacterial property and stability, which is useful for a wide range of applications, and a liquid formulation for contact lenses, containing the water-soluble antibacterial polymer as a preservative or a disinfectant, which is suitably used for disinfection and preservation of contact lenses.... Usually a preservative is added in a preserving solution for contact lenses. Particularly, in water-absorptive soft contact lenses, bacteria easily breed, from the nature of their water absorptive property. Therefore, antiseptic action is required during preservation, and further periodical disinfection is required. Further, it has now been common to employ disinfection by a disinfectant in addition to thermal disinfection by boiling for soft contact lenses.... However, the water-absorptive soft contact lens swells when it absorbs water, and it has a problem such that the molecular interstices of the material will open, and the relatively low molecular weight preservative and disinfectant tend to be absorbed in the interstices and concentrated. Further, a problem is pointed out, such that the preservative or the disinfectant which is absorbed and concentrated in a soft contact lens, impairs eye tissues.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

Keeping Current

In order to stay informed about patents and patent applications dealing with contact lenses, you can access the U.S. Patent Office archive via the Internet at the following Web address: **http://www.uspto.gov/patft/index.html**. You will see two broad options: (1) Issued Patent, and (2) Published Applications. To see a list of issued patents, perform the following steps: Under "Issued Patents," click "Quick Search." Then, type "contact lenses" (or synonyms) into the "Term 1" box. After clicking on the search button, scroll down to see the various patents which have been granted to date on contact lenses.

You can also use this procedure to view pending patent applications concerning contact lenses. Simply go back to the following Web address: **http://www.uspto.gov/patft/index.html**. Select "Quick Search" under "Published Applications." Then proceed with the steps listed above.

CHAPTER 7. BOOKS ON CONTACT LENSES

Overview

This chapter provides bibliographic book references relating to contact lenses. In addition to online booksellers such as **www.amazon.com** and **www.bn.com**, excellent sources for book titles on contact lenses include the Combined Health Information Database and the National Library of Medicine. Your local medical library also may have these titles available for loan.

Book Summaries: Online Booksellers

Commercial Internet-based booksellers, such as Amazon.com and Barnes&Noble.com, offer summaries which have been supplied by each title's publisher. Some summaries also include customer reviews. Your local bookseller may have access to in-house and commercial databases that index all published books (e.g. Books in Print®). **IMPORTANT NOTE:** Online booksellers typically produce search results for medical and non-medical books. When searching for "contact lenses" at online booksellers' Web sites, you may discover non-medical books that use the generic term "contact lenses" (or a synonym) in their titles. The following is indicative of the results you might find when searching for "contact lenses" (sorted alphabetically by title; follow the hyperlink to view more details at Amazon.com):

- **A clinical guide to soft contact lenses** by Michael R. Spinell; ISBN: 0801967872; http://www.amazon.com/exec/obidos/ASIN/0801967872/icongroupinterna
- **A Color Atlas of Contact Lenses and Prosthetics** by Montague Ruben (1990); ISBN: 0801662397; http://www.amazon.com/exec/obidos/ASIN/0801662397/icongroupinterna
- **Basic and Clinical Science Course 1996-1997: Optics, Refraction and Contact Lenses**; ISBN: 1560551291; http://www.amazon.com/exec/obidos/ASIN/1560551291/icongroupinterna
- **Basic and Clinical Science Course 1997-1998: Optics, Refraction and Contact Lenses**; ISBN: 1560550775; http://www.amazon.com/exec/obidos/ASIN/1560550775/icongroupinterna

- **Basic and Clinical Science Course 1999-2000: Optics, Refraction and Contact Lenses (Basic and Clinical Science Course 1999-2000)**; ISBN: 1560551569; http://www.amazon.com/exec/obidos/ASIN/1560551569/icongroupinterna
- **Basic and Clinical Science Course 2002/2003: Optics, Refraction and Contact Lenses** (2002); ISBN: 1560552271; http://www.amazon.com/exec/obidos/ASIN/1560552271/icongroupinterna
- **Bennett and Grohe's Manual of Rigid Gas-Permeable Contact Lenses** by Edward S. Bennett, et al; ISBN: 0750673354; http://www.amazon.com/exec/obidos/ASIN/0750673354/icongroupinterna
- **Bury your Eyeglasses or Contact Lenses without a priest! UcanC2 (Audio Cassette and Graphic chart)** by Stephen Demjen; ISBN: 0968548105; http://www.amazon.com/exec/obidos/ASIN/0968548105/icongroupinterna
- **Clinical Manual of Contact Lenses** by Edward S. Bennett (Editor), Vinita Allee Henry (Editor) (2000); ISBN: 0781719518; http://www.amazon.com/exec/obidos/ASIN/0781719518/icongroupinterna
- **Close Contacts: The Joys and Tears of Contact Lenses-A User's Guide** by Caroline Archer (1995); ISBN: 0860517519; http://www.amazon.com/exec/obidos/ASIN/0860517519/icongroupinterna
- **Color Atlas of Contact Lenses** by Montague Ruben; ISBN: 0838511759; http://www.amazon.com/exec/obidos/ASIN/0838511759/icongroupinterna
- **Color Atlas of Contact Lenses** by Wulf Ehrich, Daniel Epstein (1988); ISBN: 0865772789; http://www.amazon.com/exec/obidos/ASIN/0865772789/icongroupinterna
- **Complete Guide to Eyecare, Eyeglasses & Contact Lenses (4th Ed)** by Walter J. Zinn, Herbert Solomon (Contributor); ISBN: 0811908216; http://www.amazon.com/exec/obidos/ASIN/0811908216/icongroupinterna
- **Consumer's Guide to Contact Lenses** by Spencer E. Sherman; ISBN: 0385274033; http://www.amazon.com/exec/obidos/ASIN/0385274033/icongroupinterna
- **Contact Lenses** by James V. Aquavella, Rao N. Guliapalli; ISBN: 0397506554; http://www.amazon.com/exec/obidos/ASIN/0397506554/icongroupinterna
- **Contact Lenses** by Ken Daniels; ISBN: 1556423454; http://www.amazon.com/exec/obidos/ASIN/1556423454/icongroupinterna
- **Contact Lenses** by Christopher Snyder, Gerald Eugene Lowther (1992); ISBN: 0750691875; http://www.amazon.com/exec/obidos/ASIN/0750691875/icongroupinterna
- **Contact Lenses** by Tony Hough, Phillips (1998); ISBN: 0750637234; http://www.amazon.com/exec/obidos/ASIN/0750637234/icongroupinterna
- **CONTACT LENSES - PHG**; ISBN: 0906348889; http://www.amazon.com/exec/obidos/ASIN/0906348889/icongroupinterna
- **Contact Lenses #1007** (1940); ISBN: 999661249X; http://www.amazon.com/exec/obidos/ASIN/999661249X/icongroupinterna
- **Contact Lenses (International Ophthalmology Clinics, Vol 31, No 2)** by Gilbert Smolin; ISBN: 0316802409; http://www.amazon.com/exec/obidos/ASIN/0316802409/icongroupinterna

- **Contact Lenses (Ophthalmic Technical Skills Series)** by Phyllis L. Rakow; ISBN: 1556420242;
  http://www.amazon.com/exec/obidos/ASIN/1556420242/icongroupinterna
- **Contact lenses : advances in design, fitting, application : selected papers and discussion from the 19th annual convention of the Contact Lens Society of America, Orlando, Florida**; ISBN: 0883720744;
  http://www.amazon.com/exec/obidos/ASIN/0883720744/icongroupinterna
- **Contact lenses : the CLAO guide to basic science and clinical practice**; ISBN: 0840397062;
  http://www.amazon.com/exec/obidos/ASIN/0840397062/icongroupinterna
- **Contact lenses : the CLAO guide to basic science and clinical practice**; ISBN: 0840397070;
  http://www.amazon.com/exec/obidos/ASIN/0840397070/icongroupinterna
- **Contact lenses and corneal disease : a programmed course** by Antonio R. Gasset; ISBN: 0838511996;
  http://www.amazon.com/exec/obidos/ASIN/0838511996/icongroupinterna
- **Contact Lenses A-Z** by Nathan Efron; ISBN: 0750653027;
  http://www.amazon.com/exec/obidos/ASIN/0750653027/icongroupinterna
- **Contact Lenses for Preand Post-Surgery** by Michael G. Harris (Editor), Richard London (Editor); ISBN: 0815114001;
  http://www.amazon.com/exec/obidos/ASIN/0815114001/icongroupinterna
- **Contact Lenses in Clinical Ophthalmology** by Mark J. Mannis, Karla Zadnik (2003); ISBN: 0387404007;
  http://www.amazon.com/exec/obidos/ASIN/0387404007/icongroupinterna
- **Contact Lenses in Ophthalmology (Colour Manuals in Ophthalmology)** by Michael S. Wilson, E.A. Millis; ISBN: 0407014403;
  http://www.amazon.com/exec/obidos/ASIN/0407014403/icongroupinterna
- **Contact Lenses: A Clinical Approach to Fitting** by Robert H. Hales; ISBN: 0683038516;
  http://www.amazon.com/exec/obidos/ASIN/0683038516/icongroupinterna
- **Contact Lenses: A Guide to Selection, Fitting, and Management of Complications** by Susan M., M.D. Stenson (Editor); ISBN: 0838512852;
  http://www.amazon.com/exec/obidos/ASIN/0838512852/icongroupinterna
- **Contact Lenses: A Guide to Successful Wear and Care (Positive Health Guide)** by Montague Ruben, Hikaru Hamano; ISBN: 0668059796;
  http://www.amazon.com/exec/obidos/ASIN/0668059796/icongroupinterna
- **Contact Lenses: A Handbook for Patients** by Hans-Walter. Roth; ISBN: 0061423017;
  http://www.amazon.com/exec/obidos/ASIN/0061423017/icongroupinterna
- **Contact Lenses: A Textbook for Practitioner and Student** by Janet Stone (1984); ISBN: 0407932747;
  http://www.amazon.com/exec/obidos/ASIN/0407932747/icongroupinterna
- **Contact Lenses: Fundamentals and Clinical Use** by Harold A. Stein (Editor), et al; ISBN: 1556423403;
  http://www.amazon.com/exec/obidos/ASIN/1556423403/icongroupinterna

- **Contact Lenses: How to Wear Them Successfully.** by Linda McDonald; ISBN: 0385006543;
  http://www.amazon.com/exec/obidos/ASIN/0385006543/icongroupinterna
- **Contact Lenses: Medical Aspects** by Montague Ruben, C.Y. Khoo; ISBN: 9971973936;
  http://www.amazon.com/exec/obidos/ASIN/9971973936/icongroupinterna
- **Contact Lenses: The Clao Guide to Basic Science and Clinical Practice** by Peter, Dr. Kastl (Editor); ISBN: 0840393857;
  http://www.amazon.com/exec/obidos/ASIN/0840393857/icongroupinterna
- **Contact Lenses: Treatment Options for Ocular Disease** by Michael G. Harris (Editor), Richard London (Editor); ISBN: 0815146450;
  http://www.amazon.com/exec/obidos/ASIN/0815146450/icongroupinterna
- **Contact Lenses: What You Need to Know** by Judy Kody; ISBN: 9997225996;
  http://www.amazon.com/exec/obidos/ASIN/9997225996/icongroupinterna
- **Corneal contact lenses**; ISBN: 0801618312;
  http://www.amazon.com/exec/obidos/ASIN/0801618312/icongroupinterna
- **Corneal Physiology and Disposable Contact Lenses** by Hikaru, Md. Hamano (Editor), Herbert E. Kaufman (Editor) (1997); ISBN: 0750699272;
  http://www.amazon.com/exec/obidos/ASIN/0750699272/icongroupinterna
- **Dabezies Contact Lenses Update 3**; ISBN: 0127909605;
  http://www.amazon.com/exec/obidos/ASIN/0127909605/icongroupinterna
- **Diagnosis, Contact Lens Prescribing, and Care of the Keratoconus Patient: Clinical Practice in Contact Lenses** by Karla Zadnik, Joseph T. Barr; ISBN: 0750696761;
  http://www.amazon.com/exec/obidos/ASIN/0750696761/icongroupinterna
- **Dryness, Tears, and Contact Lens Wear: Clinical Practice in Contact Lenses (Clinical Practice in Contact Lenses)** by Gerald E. Lowther (1997); ISBN: 0750695145;
  http://www.amazon.com/exec/obidos/ASIN/0750695145/icongroupinterna
- **Everything You Need to Know About Contact Lenses** by Robert Youngson; ISBN: 0859694593;
  http://www.amazon.com/exec/obidos/ASIN/0859694593/icongroupinterna
- **Extended Wear Contact Lenses** by Jack Hartstein (Editor); ISBN: 0801621097;
  http://www.amazon.com/exec/obidos/ASIN/0801621097/icongroupinterna
- **Eye Care Visits and Use of Eyeglasses or Contact Lenses, United States, 1979 and 1980** by Gail S. Poe (1984); ISBN: 0840602871;
  http://www.amazon.com/exec/obidos/ASIN/0840602871/icongroupinterna
- **Eyewear and Contact Lenses for Sports: A Publication of Leonardo Sports Vision** by Gioacchino Balducci (Editor), et al (1996); ISBN: 0965246558;
  http://www.amazon.com/exec/obidos/ASIN/0965246558/icongroupinterna
- **Fitting Contact Lenses** by Susan Kaye Cogger; ISBN: 0881670421;
  http://www.amazon.com/exec/obidos/ASIN/0881670421/icongroupinterna
- **Fitting guide for hard and soft contact lenses : a practical approach** by Harold A. Stein; ISBN: 0801647770;
  http://www.amazon.com/exec/obidos/ASIN/0801647770/icongroupinterna
- **Fitting Guide for Rigid and Soft Contact Lenses** by Harold A. Stein, et al; ISBN: 0801651824;
  http://www.amazon.com/exec/obidos/ASIN/0801651824/icongroupinterna

- **Fitting Guide for Rigid and Soft Contact Lenses** (1990); ISBN: 0801647843; http://www.amazon.com/exec/obidos/ASIN/0801647843/icongroupinterna
- **Fitting Guide for Rigid and Soft Contact Lenses: A Practical Approach** by Harold A., Md. Stein, et al; ISBN: 0323014402; http://www.amazon.com/exec/obidos/ASIN/0323014402/icongroupinterna
- **Glasses and Contact Lenses: Your Guide to Eyes, Eyewear, & Eye Care** by Alvin, Dr. Silverstein, Virginia Silverstein (Contributor); ISBN: 0397321856; http://www.amazon.com/exec/obidos/ASIN/0397321856/icongroupinterna
- **Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises** by Steven M. Beresford (Contributor), et al (1996); ISBN: 0684814382; http://www.amazon.com/exec/obidos/ASIN/0684814382/icongroupinterna
- **Last Minute Optics: A Concise Review of Optics, Refraction and Contact Lenses** by David G. Hunter, Constance E. West; ISBN: 1556423179; http://www.amazon.com/exec/obidos/ASIN/1556423179/icongroupinterna
- **Malpractice and Contact Lenses** (1991); ISBN: 0962034908; http://www.amazon.com/exec/obidos/ASIN/0962034908/icongroupinterna
- **Malpractice and Contact Lenses: A Guide to Limiting Liability in Contact Lens Practice** by Harvey M. Rosenwasser (1991); ISBN: 0750691921; http://www.amazon.com/exec/obidos/ASIN/0750691921/icongroupinterna
- **Marketing, Managing, and Contact Lenses** by Robert A. Koetting (1992); ISBN: 0750691751; http://www.amazon.com/exec/obidos/ASIN/0750691751/icongroupinterna
- **My Contact Lenses Weigh 3 Pounds Each** by Cathy Guisewite; ISBN: 0449216357; http://www.amazon.com/exec/obidos/ASIN/0449216357/icongroupinterna
- **Optics, Refraction and Contact Lenses**; ISBN: 1560551038; http://www.amazon.com/exec/obidos/ASIN/1560551038/icongroupinterna
- **Optics, Refraction and Contact Lenses: Section Three (Basic and Clinical Science Course)** (1989); ISBN: 1560550538; http://www.amazon.com/exec/obidos/ASIN/1560550538/icongroupinterna
- **Plastic contact lenses, 1972** by Steven Summerville; ISBN: 0815504411; http://www.amazon.com/exec/obidos/ASIN/0815504411/icongroupinterna
- **Pocket Guide to Contact Lenses** by Hodd Nigel Burnett; ISBN: 085140734X; http://www.amazon.com/exec/obidos/ASIN/085140734X/icongroupinterna
- **Prices of private spectacles and contact lenses**; ISBN: 0117003212; http://www.amazon.com/exec/obidos/ASIN/0117003212/icongroupinterna
- **Prostheses & Contact Lenses (Ser. 10Pc-80)** by James R., Jr. Critser (1981); ISBN: 0914428853; http://www.amazon.com/exec/obidos/ASIN/0914428853/icongroupinterna
- **Refractive keratoplasty : proceedings of the semiannual and annual meetings of the Keratorefractive Society on radial ketatotomy, extended wear contact lenses, and kratorefraction**; ISBN: 0910737045; http://www.amazon.com/exec/obidos/ASIN/0910737045/icongroupinterna

- **Rigid Gas-Permeable Contact Lenses** by Edward S. Bennett, Robert M. Grohe; ISBN: 0878730575;
  http://www.amazon.com/exec/obidos/ASIN/0878730575/icongroupinterna
- **Silicone Hydrogels: The Rebirth of Continuous Wear Contact Lenses** by Deborah Sweeney (Editor); ISBN: 0750644621;
  http://www.amazon.com/exec/obidos/ASIN/0750644621/icongroupinterna
- **Soft contact lenses : second National Research Symposium proceedings, Chicago, Illinois, August 16-17, 1975**; ISBN: 0444152334;
  http://www.amazon.com/exec/obidos/ASIN/0444152334/icongroupinterna
- **Soft Contact Lenses: Clinical and Applied Technology (Wiley Series in Clinical Ophthalmology) (A Wiley Medical Publication)** by Ruben; ISBN: 0471744301;
  http://www.amazon.com/exec/obidos/ASIN/0471744301/icongroupinterna
- **Specialty Contact Lenses: A Fitter's Guide** by Carol A. Schwartz; ISBN: 0721647472;
  http://www.amazon.com/exec/obidos/ASIN/0721647472/icongroupinterna
- **Symposium on Contact Lenses; transactions of the New Orleans Academy of Ophthalmology**; ISBN: 0801636760;
  http://www.amazon.com/exec/obidos/ASIN/0801636760/icongroupinterna
- **The 2003-2008 World Outlook for Contact Lenses [DOWNLOAD: PDF]**; ISBN: B00009KFRW;
  http://www.amazon.com/exec/obidos/ASIN/B00009KFRW/icongroupinterna
- **The 2003-2008 World Outlook for Contact Lenses Aftercare [DOWNLOAD: PDF]**; ISBN: B00009KFRV;
  http://www.amazon.com/exec/obidos/ASIN/B00009KFRV/icongroupinterna
- **The Complete Guide to Eye Care, Eyeglasses and Contact Lenses** by Walter, O.D. Zinn, Herbert, O.D. Solomon; ISBN: 0811906426;
  http://www.amazon.com/exec/obidos/ASIN/0811906426/icongroupinterna
- **The Complete Guide to Eye Care, Eyeglasses and Contact Lenses** (1987); ISBN: 0811902811;
  http://www.amazon.com/exec/obidos/ASIN/0811902811/icongroupinterna
- **The Joys and Dangers of Contact Lenses** by Jack Hartstein; ISBN: 080623198X;
  http://www.amazon.com/exec/obidos/ASIN/080623198X/icongroupinterna
- **UK Contact Lenses Report 2002 [DOWNLOAD: PDF]** by Snapshots International Ltd (Author); ISBN: B00006FCE1;
  http://www.amazon.com/exec/obidos/ASIN/B00006FCE1/icongroupinterna
- **Understanding contact lenses (and the correction of the abnormal eye)** by Montague Ruben; ISBN: 0433288000;
  http://www.amazon.com/exec/obidos/ASIN/0433288000/icongroupinterna
- **What do you know about vision? : your questions on eyes, glasses and contact lenses answered** by Michel Millodot; ISBN: 088510045X;
  http://www.amazon.com/exec/obidos/ASIN/088510045X/icongroupinterna

The National Library of Medicine Book Index

The National Library of Medicine at the National Institutes of Health has a massive database of books published on healthcare and biomedicine. Go to the following Internet site,

http://locatorplus.gov/, and then select "Search LOCATORplus." Once you are in the search area, simply type "contact lenses" (or synonyms) into the search box, and select "books only." From there, results can be sorted by publication date, author, or relevance. The following was recently catalogued by the National Library of Medicine:[11]

- **Conoid contact lenses.** Author: Thomas, Penrhyn F.; Year: 1972; Sydney, Corneal Lens Corp. [c1967]
- **Contact lenses. Edited by O. H. Dabezies [et al.].** Author: Dabezies, O. H.; Year: 1967; Basel, New York, Karger, 1967
- **Contact lenses: how to wear them successfully.** Author: McDonald, Linda.; Year: 1964; Garden City, N. Y., Doubleday, 1972
- **Contact lenses; a textbook for practitioner and student. Edited by Janet Stone and A. J. Phillips.** Author: Stone, Janet.; Year: 1969; London, Barrie; Jenkins, Published in assn. with the British Optical Assn. [c1972]; ISBN: 0214653471 http://www.amazon.com/exec/obidos/ASIN/0214653471/icongroupinterna
- **Corneal and scleral contact lenses; proceedings of the International Congress. Louis J. Girard, editor; Joseph W. Soper, associate editor; Carleen Gunn, assistant editor.** Author: Girard, Louis Joseph,; Year: 1967; St. Louis, Mosby, 1967
- **Corneal contact lenses, by members of the Contact Lens Section, Department of Ophthalmology, Baylor College of Medicine, Houston, Texas. Editor: Louis J. Girard. Associate editors: Joseph W. Soper [and] Whitney G. Sampson. Assistant editor: Carleen Gunn.** Author: Baylor College of Medicine. Contact Lens Section.; Year: 1972; St. Louis, Mosby, 1970
- **Corneal contact lenses, by members of the Contact Lens Section, Department of Ophthalmology, Baylor University College of Medicine, Houston, Texas. Editor: Louis J. Girard. Associate editors: Joseph W. Soper [and] Whitney G. Sampson.** Author: Baylor University. Dept. of Ophthalmology.; Year: 1969; St. Louis, Mosby, 1964
- **Corneal contact lenses: fitting procedures [by] William R. Baldwin and Charles R. Shick.** Author: Baldwin, William R.; Year: 1972; Philadelphia, Chilton [c1962]
- **Optics of contact lenses.** Author: Bennett, Arthur G. (Arthur George); Year: 1966; London, Assn. of Dispensing Opticians, 1966
- **Optics of contact lenses.** Author: Bennett, Arthur G. (Arthur George); Year: 1964; London, Assn. of Dispensing Opticians, 1963
- **Optics of contact lenses.** Author: Bennett, Arthur G. (Arthur George); Year: 1961; London, Hatton, 1949
- **The truth about contact lenses; everything the wearer, or potential wearer, should know.** Author: Baker, Jeffrey.; Year: 1970; New York, Putnam [1970]

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[11] In addition to LOCATORPlus, in collaboration with authors and publishers, the National Center for Biotechnology Information (NCBI) is currently adapting biomedical books for the Web. The books may be accessed in two ways: (1) by searching directly using any search term or phrase (in the same way as the bibliographic database PubMed), or (2) by following the links to PubMed abstracts. Each PubMed abstract has a "Books" button that displays a facsimile of the abstract in which some phrases are hypertext links. These phrases are also found in the books available at NCBI. Click on hyperlinked results in the list of books in which the phrase is found. Currently, the majority of the links are between the books and PubMed. In the future, more links will be created between the books and other types of information, such as gene and protein sequences and macromolecular structures. See **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Books**.

Chapters on Contact Lenses

In order to find chapters that specifically relate to contact lenses, an excellent source of abstracts is the Combined Health Information Database. You will need to limit your search to book chapters and contact lenses using the "Detailed Search" option. Go to the following hyperlink: **http://chid.nih.gov/detail/detail.html**. To find book chapters, use the drop boxes at the bottom of the search page where "You may refine your search by." Select the dates and language you prefer, and the format option "Book Chapter." Type "contact lenses" (or synonyms) into the "For these words:" box.

CHAPTER 8. MULTIMEDIA ON CONTACT LENSES

Overview

In this chapter, we show you how to keep current on multimedia sources of information on contact lenses. We start with sources that have been summarized by federal agencies, and then show you how to find bibliographic information catalogued by the National Library of Medicine.

Bibliography: Multimedia on Contact Lenses

The National Library of Medicine is a rich source of information on healthcare-related multimedia productions including slides, computer software, and databases. To access the multimedia database, go to the following Web site: **http://locatorplus.gov/**. Select "Search LOCATORplus." Once in the search area, simply type in contact lenses (or synonyms). Then, in the option box provided below the search box, select "Audiovisuals and Computer Files." From there, you can choose to sort results by publication date, author, or relevance. The following multimedia has been indexed on contact lenses (for more information, follow the hyperlink indicated):

- **Contact lenses** Source: edited by Anthony J. Phillips and Lynne Speedwell; consulting editor, Janet Stone; CD-ROM designed by Tony Hough; Year: 1997; Oxford [England]; Boston: Butterworth-Heinemann, 1997
- **Contact lenses [motion picture]** Source: University of the Witwatersrand Dept. of Ophthalmology, the Contact Lens Clinic at the Johannesburg General Hospital; Year: 1970; Format: Motion picture; Johannesburg: The University; [Jersey City, N. J.: for sale by Conrad Berens International Eye Film Library, 1970]
- **Flexible contact lenses: a 1974 update [sound recording]** Source: American Optometric Association; produced by Teach'em; Year: 1974; Format: Sound recording; St. Louis: Optometric Development Enterprises; [Chicago: for sale by Teach'em], 1974
- **Removal of corneal and scleral contact lenses [motion picture]** Source: School of Nursing, Ohio State University; produced by the Dept. of Photography and Cinema; Year: 1971; Format: Motion picture; Columbus, Ohio: The University; [for loan by Its Dept. of Photography and Cinema; Atlanta: for loan by National Medical Audiovisual Center], c1971

APPENDICES

APPENDIX A. PHYSICIAN RESOURCES

Overview

In this chapter, we focus on databases and Internet-based guidelines and information resources created or written for a professional audience.

NIH Guidelines

Commonly referred to as "clinical" or "professional" guidelines, the National Institutes of Health publish physician guidelines for the most common diseases. Publications are available at the following by relevant Institute[12]:

- Office of the Director (OD); guidelines consolidated across agencies available at **http://www.nih.gov/health/consumer/conkey.htm**
- National Institute of General Medical Sciences (NIGMS); fact sheets available at **http://www.nigms.nih.gov/news/facts/**
- National Library of Medicine (NLM); extensive encyclopedia (A.D.A.M., Inc.) with guidelines: **http://www.nlm.nih.gov/medlineplus/healthtopics.html**
- National Cancer Institute (NCI); guidelines available at **http://www.cancer.gov/cancerinfo/list.aspx?viewid=5f35036e-5497-4d86-8c2c-714a9f7c8d25**
- National Eye Institute (NEI); guidelines available at **http://www.nei.nih.gov/order/index.htm**
- National Heart, Lung, and Blood Institute (NHLBI); guidelines available at **http://www.nhlbi.nih.gov/guidelines/index.htm**
- National Human Genome Research Institute (NHGRI); research available at **http://www.genome.gov/page.cfm?pageID=10000375**
- National Institute on Aging (NIA); guidelines available at **http://www.nia.nih.gov/health/**

[12] These publications are typically written by one or more of the various NIH Institutes.

- National Institute on Alcohol Abuse and Alcoholism (NIAAA); guidelines available at **http://www.niaaa.nih.gov/publications/publications.htm**
- National Institute of Allergy and Infectious Diseases (NIAID); guidelines available at **http://www.niaid.nih.gov/publications/**
- National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS); fact sheets and guidelines available at **http://www.niams.nih.gov/hi/index.htm**
- National Institute of Child Health and Human Development (NICHD); guidelines available at **http://www.nichd.nih.gov/publications/pubskey.cfm**
- National Institute on Deafness and Other Communication Disorders (NIDCD); fact sheets and guidelines at **http://www.nidcd.nih.gov/health/**
- National Institute of Dental and Craniofacial Research (NIDCR); guidelines available at **http://www.nidr.nih.gov/health/**
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK); guidelines available at **http://www.niddk.nih.gov/health/health.htm**
- National Institute on Drug Abuse (NIDA); guidelines available at **http://www.nida.nih.gov/DrugAbuse.html**
- National Institute of Environmental Health Sciences (NIEHS); environmental health information available at **http://www.niehs.nih.gov/external/facts.htm**
- National Institute of Mental Health (NIMH); guidelines available at **http://www.nimh.nih.gov/practitioners/index.cfm**
- National Institute of Neurological Disorders and Stroke (NINDS); neurological disorder information pages available at **http://www.ninds.nih.gov/health_and_medical/disorder_index.htm**
- National Institute of Nursing Research (NINR); publications on selected illnesses at **http://www.nih.gov/ninr/news-info/publications.html**
- National Institute of Biomedical Imaging and Bioengineering; general information at **http://grants.nih.gov/grants/becon/becon_info.htm**
- Center for Information Technology (CIT); referrals to other agencies based on keyword searches available at **http://kb.nih.gov/www_query_main.asp**
- National Center for Complementary and Alternative Medicine (NCCAM); health information available at **http://nccam.nih.gov/health/**
- National Center for Research Resources (NCRR); various information directories available at **http://www.ncrr.nih.gov/publications.asp**
- Office of Rare Diseases; various fact sheets available at **http://rarediseases.info.nih.gov/html/resources/rep_pubs.html**
- Centers for Disease Control and Prevention; various fact sheets on infectious diseases available at **http://www.cdc.gov/publications.htm**

NIH Databases

In addition to the various Institutes of Health that publish professional guidelines, the NIH has designed a number of databases for professionals.[13] Physician-oriented resources provide a wide variety of information related to the biomedical and health sciences, both past and present. The format of these resources varies. Searchable databases, bibliographic citations, full-text articles (when available), archival collections, and images are all available. The following are referenced by the National Library of Medicine:[14]

- **Bioethics:** Access to published literature on the ethical, legal, and public policy issues surrounding healthcare and biomedical research. This information is provided in conjunction with the Kennedy Institute of Ethics located at Georgetown University, Washington, D.C.: **http://www.nlm.nih.gov/databases/databases_bioethics.html**
- **HIV/AIDS Resources:** Describes various links and databases dedicated to HIV/AIDS research: **http://www.nlm.nih.gov/pubs/factsheets/aidsinfs.html**
- **NLM Online Exhibitions:** Describes "Exhibitions in the History of Medicine": **http://www.nlm.nih.gov/exhibition/exhibition.html**. Additional resources for historical scholarship in medicine: **http://www.nlm.nih.gov/hmd/hmd.html**
- **Biotechnology Information:** Access to public databases. The National Center for Biotechnology Information conducts research in computational biology, develops software tools for analyzing genome data, and disseminates biomedical information for the better understanding of molecular processes affecting human health and disease: **http://www.ncbi.nlm.nih.gov/**
- **Population Information:** The National Library of Medicine provides access to worldwide coverage of population, family planning, and related health issues, including family planning technology and programs, fertility, and population law and policy: **http://www.nlm.nih.gov/databases/databases_population.html**
- **Cancer Information:** Access to cancer-oriented databases: **http://www.nlm.nih.gov/databases/databases_cancer.html**
- **Profiles in Science:** Offering the archival collections of prominent twentieth-century biomedical scientists to the public through modern digital technology: **http://www.profiles.nlm.nih.gov/**
- **Chemical Information:** Provides links to various chemical databases and references: **http://sis.nlm.nih.gov/Chem/ChemMain.html**
- **Clinical Alerts:** Reports the release of findings from the NIH-funded clinical trials where such release could significantly affect morbidity and mortality: **http://www.nlm.nih.gov/databases/alerts/clinical_alerts.html**
- **Space Life Sciences:** Provides links and information to space-based research (including NASA): **http://www.nlm.nih.gov/databases/databases_space.html**
- **MEDLINE:** Bibliographic database covering the fields of medicine, nursing, dentistry, veterinary medicine, the healthcare system, and the pre-clinical sciences: **http://www.nlm.nih.gov/databases/databases_medline.html**

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[13] Remember, for the general public, the National Library of Medicine recommends the databases referenced in MEDLINE*plus* (**http://medlineplus.gov/** or **http://www.nlm.nih.gov/medlineplus/databases.html**).

[14] See **http://www.nlm.nih.gov/databases/databases.html**.

- **Toxicology and Environmental Health Information (TOXNET):** Databases covering toxicology and environmental health: **http://sis.nlm.nih.gov/Tox/ToxMain.html**
- **Visible Human Interface:** Anatomically detailed, three-dimensional representations of normal male and female human bodies: **http://www.nlm.nih.gov/research/visible/visible_human.html**

The Combined Health Information Database

A comprehensive source of information on clinical guidelines written for professionals is the Combined Health Information Database. You will need to limit your search to one of the following: Brochure/Pamphlet, Fact Sheet, or Information Package, and "contact lenses" using the "Detailed Search" option. Go directly to the following hyperlink: **http://chid.nih.gov/detail/detail.html**. To find associations, use the drop boxes at the bottom of the search page where "You may refine your search by." For the publication date, select "All Years." Select your preferred language and the format option "Fact Sheet." Type "contact lenses" (or synonyms) into the "For these words:" box. The following is a sample result:

- **AIDS Task Force Policy Statement**

  Source: American Journal of Optometry and Physiological Optics; Vol. 65, no. 7.

  Contact: Williams and Wilkins, Epidemiology Resource Inc., 428 E Preston St, Baltimore, MD, 21202, (410) 528-4000.

  Summary: This policy statement, from the American Academy of Optometry, presents recommendations for the provision of care to Persons with AIDS (PWA's), as well as those who test positive for Human immunodeficiency virus (HIV) antibodies. It also presents recommendations for patient and staff education about HIV infection and Acquired immunodeficiency syndrome (AIDS). Recommendations deal with handwashing, gloves, instruments, **contact lenses**, decontamination, masks, and protective eyewear.

The NLM Gateway[15]

The NLM (National Library of Medicine) Gateway is a Web-based system that lets users search simultaneously in multiple retrieval systems at the U.S. National Library of Medicine (NLM). It allows users of NLM services to initiate searches from one Web interface, providing one-stop searching for many of NLM's information resources or databases.[16] To use the NLM Gateway, simply go to the search site at **http://gateway.nlm.nih.gov/gw/Cmd**. Type "contact lenses" (or synonyms) into the search box and click "Search." The results will be presented in a tabular form, indicating the number of references in each database category.

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[15] Adapted from NLM: **http://gateway.nlm.nih.gov/gw/Cmd?Overview.x**.

[16] The NLM Gateway is currently being developed by the Lister Hill National Center for Biomedical Communications (LHNCBC) at the National Library of Medicine (NLM) of the National Institutes of Health (NIH).

Results Summary

Category	Items Found
Journal Articles	8411
Books / Periodicals / Audio Visual	328
Consumer Health	135
Meeting Abstracts	3
Other Collections	0
Total	8877

HSTAT[17]

HSTAT is a free, Web-based resource that provides access to full-text documents used in healthcare decision-making.[18] These documents include clinical practice guidelines, quick-reference guides for clinicians, consumer health brochures, evidence reports and technology assessments from the Agency for Healthcare Research and Quality (AHRQ), as well as AHRQ's Put Prevention Into Practice.[19] Simply search by "contact lenses" (or synonyms) at the following Web site: **http://text.nlm.nih.gov**.

Coffee Break: Tutorials for Biologists[20]

Coffee Break is a general healthcare site that takes a scientific view of the news and covers recent breakthroughs in biology that may one day assist physicians in developing treatments. Here you will find a collection of short reports on recent biological discoveries. Each report incorporates interactive tutorials that demonstrate how bioinformatics tools are used as a part of the research process. Currently, all Coffee Breaks are written by NCBI staff.[21] Each report is about 400 words and is usually based on a discovery reported in one or more articles from recently published, peer-reviewed literature.[22] This site has new articles every few weeks, so it can be considered an online magazine of sorts. It is intended for general background information. You can access the Coffee Break Web site at the following hyperlink: **http://www.ncbi.nlm.nih.gov/Coffeebreak/**.

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[17] Adapted from HSTAT: **http://www.nlm.nih.gov/pubs/factsheets/hstat.html**.

[18] The HSTAT URL is **http://hstat.nlm.nih.gov/**.

[19] Other important documents in HSTAT include: the National Institutes of Health (NIH) Consensus Conference Reports and Technology Assessment Reports; the HIV/AIDS Treatment Information Service (ATIS) resource documents; the Substance Abuse and Mental Health Services Administration's Center for Substance Abuse Treatment (SAMHSA/CSAT) Treatment Improvement Protocols (TIP) and Center for Substance Abuse Prevention (SAMHSA/CSAP) Prevention Enhancement Protocols System (PEPS); the Public Health Service (PHS) Preventive Services Task Force's *Guide to Clinical Preventive Services*; the independent, nonfederal Task Force on Community Services' *Guide to Community Preventive Services*; and the Health Technology Advisory Committee (HTAC) of the Minnesota Health Care Commission (MHCC) health technology evaluations.

[20] Adapted from **http://www.ncbi.nlm.nih.gov/Coffeebreak/Archive/FAQ.html**.

[21] The figure that accompanies each article is frequently supplied by an expert external to NCBI, in which case the source of the figure is cited. The result is an interactive tutorial that tells a biological story.

[22] After a brief introduction that sets the work described into a broader context, the report focuses on how a molecular understanding can provide explanations of observed biology and lead to therapies for diseases. Each vignette is accompanied by a figure and hypertext links that lead to a series of pages that interactively show how NCBI tools and resources are used in the research process.

Other Commercial Databases

In addition to resources maintained by official agencies, other databases exist that are commercial ventures addressing medical professionals. Here are some examples that may interest you:

- **CliniWeb International:** Index and table of contents to selected clinical information on the Internet; see **http://www.ohsu.edu/cliniweb/**.
- **Medical World Search:** Searches full text from thousands of selected medical sites on the Internet; see **http://www.mwsearch.com/**.

APPENDIX B. PATIENT RESOURCES

Overview

Official agencies, as well as federally funded institutions supported by national grants, frequently publish a variety of guidelines written with the patient in mind. These are typically called "Fact Sheets" or "Guidelines." They can take the form of a brochure, information kit, pamphlet, or flyer. Often they are only a few pages in length. Since new guidelines on contact lenses can appear at any moment and be published by a number of sources, the best approach to finding guidelines is to systematically scan the Internet-based services that post them.

Patient Guideline Sources

The remainder of this chapter directs you to sources which either publish or can help you find additional guidelines on topics related to contact lenses. Due to space limitations, these sources are listed in a concise manner. Do not hesitate to consult the following sources by either using the Internet hyperlink provided, or, in cases where the contact information is provided, contacting the publisher or author directly.

The National Institutes of Health

The NIH gateway to patients is located at **http://health.nih.gov/**. From this site, you can search across various sources and institutes, a number of which are summarized below.

Topic Pages: MEDLINEplus

The National Library of Medicine has created a vast and patient-oriented healthcare information portal called MEDLINEplus. Within this Internet-based system are "health topic pages" which list links to available materials relevant to contact lenses. To access this system, log on to **http://www.nlm.nih.gov/medlineplus/healthtopics.html**. From there you can either search using the alphabetical index or browse by broad topic areas. Recently, MEDLINEplus listed the following when searched for "contact lenses":

- Other Guides

  Eye Diseases
  http://www.nlm.nih.gov/medlineplus/eyediseasesgeneral.html

  Eye Injuries
  http://www.nlm.nih.gov/medlineplus/eyeinjuries.html

  Eye Wear
  http://www.nlm.nih.gov/medlineplus/eyewear.html

  Laser Eye Surgery
  http://www.nlm.nih.gov/medlineplus/lasereyesurgery.html

  Refractive Errors
  http://www.nlm.nih.gov/medlineplus/refractiveerrors.html

Within the health topic page dedicated to contact lenses, the following was listed:

- General/Overviews

  Contact Lenses: An Unobstructed View
  Source: Mayo Foundation for Medical Education and Research
  http://www.mayoclinic.com/invoke.cfm?id=WL00010

  Correcting Your Vision with Glasses and Contacts
  Source: American Academy of Ophthalmology
  http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZ9BM8OH4C&sub_cat=114

- Specific Conditions/Aspects

  Bridges, Temples, and Hinges
  Source: American Academy of Ophthalmology
  http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZ69YNLH4C&sub_cat=114

  Buying Contact Lenses on the Internet, by Phone or by Mail: Questions and Answers
  Source: Center for Devices and Radiological Health
  http://www.fda.gov/cdrh/consumer/buycontactqa.html

  Contact Lenses & Cosmetics
  Source: American Optometric Association
  http://www.aoanet.org/conditions/contact_lenses_cosmetics.asp

  Contact Lenses versus Glasses
  Source: Mayo Foundation for Medical Education and Research
  http://www.mayoclinic.com/invoke.cfm?id=SC00002

  Contact Lenses: Frequently Asked Questions
  Source: Prevent Blindness America
  http://www.preventblindness.org/eye_problems/contacts.html

  Cool Colorful Cosmetic Lenses Pose a Health Risk
  Source: Prevent Blindness America
  http://www.preventblindness.org/news/releases/contactlenseinjuries.htm

Extended Wear Contact Lenses
Source: American Academy of Ophthalmology
http://www.medem.com/search/article_display.cfm?path=n:&mstr=/ZZZ9XNDMC1D.html&soc=AAO&srch_typ=NAV_SERCH

Fashion vs. Frugality
Source: American Academy of Ophthalmology
http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZKB23HH4C&sub_cat=114

FDA Issues Warning on Decorative Contact Lenses
Source: Food and Drug Administration
http://www.fda.gov/fdac/features/2003/103_eyes.html

Frames
Source: American Academy of Ophthalmology
http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZN1UNMT7C&sub_cat=114

How to Read Your Eyeglasses Prescription
Source: American Academy of Ophthalmology
http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZG178LH4C&sub_cat=114

Lens Design
Source: American Academy of Ophthalmology
http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZ9VKPHH4C&sub_cat=114

Lens Enhancements
Source: American Academy of Ophthalmology
http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZ58PPGH4C&sub_cat=114

Lens Material
Source: American Academy of Ophthalmology
http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZRALLKH4C&sub_cat=114

Potential Eye Disorders from UV Radiation
Source: American Academy of Ophthalmology
http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZGKKBY08C&sub_cat=113

Tips on Selecting the Right Frames for Your Face
Source: American Academy of Ophthalmology
http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZLTYQLH4C&sub_cat=114

Vision Correction: Taking a Look at What's New
Source: Food and Drug Administration
http://www.fda.gov/fdac/features/2001/501_eyes.html

What to Do with Your Old Glasses
Source: American Academy of Ophthalmology
http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZAJQ6LH4C&sub_cat=114

What to Look for in a Pair of Sunglasses
Source: Food and Drug Administration
http://www.fda.gov/fdac/features/2002/402_sun.html

- Children

  Eyeglasses for Infants and Children
  Source: American Academy of Ophthalmology
  http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZSOWVEH4C&sub_cat=114

  Taking a Good Look at Glasses
  Source: Nemours Foundation
  http://kidshealth.org/kid/stay_healthy/body/glasses.html

- Organizations

  American Academy of Ophthalmology
  http://www.aao.org/

  American Optometric Association
  http://www.aoanet.org/

  National Eye Institute
  http://www.nei.nih.gov/

- Pictures/Diagrams

  Diagram of the Eye
  Source: National Eye Institute
  http://www.nei.nih.gov/health/eyediagram/index.htm

- Prevention/Screening

  Eye Safety at Work
  Source: Mayo Foundation for Medical Education and Research
  http://www.mayoclinic.com/invoke.cfm?id=WL00028

  Eye Safety for Emergency Response and Disaster Recovery
  Source: National Institute for Occupational Safety and Health
  http://www.cdc.gov/niosh/eyesafe.html

  Recommended Sports Eye Protectors
  Source: Prevent Blindness America
  http://www.preventblindness.org/safety/recommended.html

  Selecting the Right Sunglasses
  Source: American Academy of Ophthalmology
  http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZLSXBLH4C&sub_cat=113

  Tips for Buying Sports Eye Protectors
  Source: Prevent Blindness America
  http://www.preventblindness.org/safety/tips.html

- Research

  Study Shows New Contact Lenses Safe for 30-Day Continuous Wear
  Source: American Academy of Ophthalmology
  http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZGUC327WC&sub_cat=114

- Statistics

  Contact Lenses: Facts and Stats
  Source: American Optometric Association
  http://www.aoanet.org/conditions/facts_stats.asp

You may also choose to use the search utility provided by MEDLINEplus at the following Web address: **http://www.nlm.nih.gov/medlineplus/**. Simply type a keyword into the search box and click "Search." This utility is similar to the NIH search utility, with the exception that it only includes materials that are linked within the MEDLINEplus system (mostly patient-oriented information). It also has the disadvantage of generating unstructured results. We recommend, therefore, that you use this method only if you have a very targeted search.

The Combined Health Information Database (CHID)

CHID Online is a reference tool that maintains a database directory of thousands of journal articles and patient education guidelines on contact lenses. CHID offers summaries that describe the guidelines available, including contact information and pricing. CHID's general Web site is **http://chid.nih.gov/**. To search this database, go to **http://chid.nih.gov/detail/detail.html**. In particular, you can use the advanced search options to look up pamphlets, reports, brochures, and information kits. The following was recently posted in this archive:

- **About Cataracts**

  Source: South Deerfield, MA: Channing L. Bete Co., Inc. 1998. 15 p.

  Contact: Available from Channing L. Bete, Co., Inc. 200 State Road, South Deerfield, MA 01373-0200. (800) 628-7733. Fax (800) 499-6464. PRICE: $1.05 each; plus shipping and handling; quantity discounts available. Order number 12468L-3-98.

  Summary: This illustrated booklet uses a question and answer format to provide readers with information about the causes, symptoms, diagnosis, and treatment of cataracts. A cataract is a clouding of the lens inside the eye. People need to learn about cataracts because they are a leading cause of vision problems. Cataracts may be caused by aging, heredity or birth defects, and eye injury. People who have diabetes have a greater risk of developing cataracts. Symptoms of cataracts include blurry, filmy, or cloudy vision; sensitivity to light and glare; second sight; and frequent change of eyeglass prescriptions. Cataracts are diagnosed by having a thorough eye examination with an eye specialist. Before undergoing surgery, people should talk with their eye specialist about the severity and progression of the cataract, how the cataract affects daily life, the risk of complications from surgery, health problems that might affect surgery, and other treatment options. The surgical procedures used to remove the lens are phacoemulsification and extracapsular extraction. An intraocular lens that is made of

clear plastic usually replaces the lens that has been removed. If the lens if not replaced, cataract eyeglasses or **contact lenses** may be used.

- **Bloodborne Pathogens**

  Contact: Jones and Bartlett Publishers, Incorporated, 40 Tall Pine Dr, Sudbury, MA, 01776, (508) 443-5000.

  Summary: This videorecording and manual combine to teach physicians, nurses, police, emergency medical technicians, firefighters, day care employees, dentists, and game wardens about protecting themselves from bloodborne pathogens on the job. The videorecording's narrator Patsy Wiggins O'Meara cautions employees to work with employers in assessing on-the-job danger, and lists four steps to take to prevent exposure. These include the use of tools and equipment, such as handwashing facilities and biohazard labels; following work-practice controls; not cleaning **contact lenses** or eating in work areas; wearing personal protective equipment like gloves and gowns; and following universal precautions by treating all blood and body fluids as infectious. The teaching aid takes a detailed look at each step and tells users to think how these steps relate to their own situations. It then outlines procedures to follow if exposure occurs. Regulations governing HIV-antibody testing and Hepatitis B vaccination are explained.

- **Glasses and Vestibular Disorders**

  Source: Portland, OR: Vestibular Disorders Association. 1998. 2 p.

  Contact: Available from Vestibular Disorders Association. P.O. Box 4467, Portland, OR 97208-4467. (503) 229-7705. Fax (503) 229-8064. E-mail: veda@vestibular.org. Website: www.vestibular.org. PRICE: $0.50 plus shipping and handling. Order number F-23.

  Summary: This fact sheet offers information about the use of and problems encountered with prescription glasses for people with vestibular disorders. One of the functions of the vestibular system is to control eye positions so that when the head moves, the eyes can automatically stay fixed on something. This is called vestibular ocular reflex (VOR). The fact sheet describes how the use of glasses can change the size of the visual world, requiring the brain to recalculate the ratio between the amount of head movement and the amount of eye movement. The fact sheet discusses bifocals, trifocals, the use of progressive addition lenses, bifocal **contact lenses**, working with one's optometrist, recommendations for single vision lenses (use of one pair of glasses for distance and another for reading or near work), and photochromic lenses (which lighten and darken with light). The fact sheet concludes that clear vision is dependent upon a normally functioning vestibular system. Because vision is linked to the vestibular system, people with vestibular disorders have special needs when selecting glasses. 3 references.

Healthfinder™

Healthfinder™ is sponsored by the U.S. Department of Health and Human Services and offers links to hundreds of other sites that contain healthcare information. This Web site is located at **http://www.healthfinder.gov**. Again, keyword searches can be used to find guidelines. The following was recently found in this database:

- **Keeping an Eye on Contact Lenses: Safety, Options Shape Contact Lens Decisions**

  Summary: This consumer health information article discusses different types of contact lenses and the potential eye-health risks related to wearing contact lenses.

  Source: U.S. Food and Drug Administration

  http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=3592

- **LASIK Eye Surgery**

  Summary: This web site offers objective information about LASIK surgery -- a procedure intended to reduce a person's dependency on glasses or contact lenses.

  Source: Center for Devices and Radiological Health, U.S. Food and Drug Administration

  http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=5768

The NIH Search Utility

The NIH search utility allows you to search for documents on over 100 selected Web sites that comprise the NIH-WEB-SPACE. Each of these servers is "crawled" and indexed on an ongoing basis. Your search will produce a list of various documents, all of which will relate in some way to contact lenses. The drawbacks of this approach are that the information is not organized by theme and that the references are often a mix of information for professionals and patients. Nevertheless, a large number of the listed Web sites provide useful background information. We can only recommend this route, therefore, for relatively rare or specific disorders, or when using highly targeted searches. To use the NIH search utility, visit the following Web page: **http://search.nih.gov/index.html**.

Additional Web Sources

A number of Web sites are available to the public that often link to government sites. These can also point you in the direction of essential information. The following is a representative sample:

- AOL: **http://search.aol.com/cat.adp?id=168&layer=&from=subcats**
- Family Village: **http://www.familyvillage.wisc.edu/specific.htm**
- Google: **http://directory.google.com/Top/Health/Conditions_and_Diseases/**
- Med Help International: **http://www.medhelp.org/HealthTopics/A.html**
- Open Directory Project: **http://dmoz.org/Health/Conditions_and_Diseases/**
- Yahoo.com: **http://dir.yahoo.com/Health/Diseases_and_Conditions/**
- WebMD®Health: **http://my.webmd.com/health_topics**

Finding Associations

There are several Internet directories that provide lists of medical associations with information on or resources relating to contact lenses. By consulting all of associations listed

in this chapter, you will have nearly exhausted all sources for patient associations concerned with contact lenses.

The National Health Information Center (NHIC)

The National Health Information Center (NHIC) offers a free referral service to help people find organizations that provide information about contact lenses. For more information, see the NHIC's Web site at **http://www.health.gov/NHIC/** or contact an information specialist by calling 1-800-336-4797.

Directory of Health Organizations

The Directory of Health Organizations, provided by the National Library of Medicine Specialized Information Services, is a comprehensive source of information on associations. The Directory of Health Organizations database can be accessed via the Internet at **http://www.sis.nlm.nih.gov/Dir/DirMain.html**. It is composed of two parts: DIRLINE and Health Hotlines.

The DIRLINE database comprises some 10,000 records of organizations, research centers, and government institutes and associations that primarily focus on health and biomedicine. To access DIRLINE directly, go to the following Web site: **http://dirline.nlm.nih.gov/**. Simply type in "contact lenses" (or a synonym), and you will receive information on all relevant organizations listed in the database.

Health Hotlines directs you to toll-free numbers to over 300 organizations. You can access this database directly at **http://www.sis.nlm.nih.gov/hotlines/**. On this page, you are given the option to search by keyword or by browsing the subject list. When you have received your search results, click on the name of the organization for its description and contact information.

The Combined Health Information Database

Another comprehensive source of information on healthcare associations is the Combined Health Information Database. Using the "Detailed Search" option, you will need to limit your search to "Organizations" and "contact lenses". Type the following hyperlink into your Web browser: **http://chid.nih.gov/detail/detail.html**. To find associations, use the drop boxes at the bottom of the search page where "You may refine your search by." For publication date, select "All Years." Then, select your preferred language and the format option "Organization Resource Sheet." Type "contact lenses" (or synonyms) into the "For these words:" box. You should check back periodically with this database since it is updated every three months.

The National Organization for Rare Disorders, Inc.

The National Organization for Rare Disorders, Inc. has prepared a Web site that provides, at no charge, lists of associations organized by health topic. You can access this database at the following Web site: **http://www.rarediseases.org/search/orgsearch.html**. Type "contact lenses" (or a synonym) into the search box, and click "Submit Query."

APPENDIX C. FINDING MEDICAL LIBRARIES

Overview

In this Appendix, we show you how to quickly find a medical library in your area.

Preparation

Your local public library and medical libraries have interlibrary loan programs with the National Library of Medicine (NLM), one of the largest medical collections in the world. According to the NLM, most of the literature in the general and historical collections of the National Library of Medicine is available on interlibrary loan to any library. If you would like to access NLM medical literature, then visit a library in your area that can request the publications for you.[23]

Finding a Local Medical Library

The quickest method to locate medical libraries is to use the Internet-based directory published by the National Network of Libraries of Medicine (NN/LM). This network includes 4626 members and affiliates that provide many services to librarians, health professionals, and the public. To find a library in your area, simply visit **http://nnlm.gov/members/adv.html** or call 1-800-338-7657.

Medical Libraries in the U.S. and Canada

In addition to the NN/LM, the National Library of Medicine (NLM) lists a number of libraries with reference facilities that are open to the public. The following is the NLM's list and includes hyperlinks to each library's Web site. These Web pages can provide information on hours of operation and other restrictions. The list below is a small sample of

[23] Adapted from the NLM: **http://www.nlm.nih.gov/psd/cas/interlibrary.html**.

libraries recommended by the National Library of Medicine (sorted alphabetically by name of the U.S. state or Canadian province where the library is located)[24]:

- **Alabama:** Health InfoNet of Jefferson County (Jefferson County Library Cooperative, Lister Hill Library of the Health Sciences), **http://www.uab.edu/infonet/**
- **Alabama:** Richard M. Scrushy Library (American Sports Medicine Institute)
- **Arizona:** Samaritan Regional Medical Center: The Learning Center (Samaritan Health System, Phoenix, Arizona), **http://www.samaritan.edu/library/bannerlibs.htm**
- **California:** Kris Kelly Health Information Center (St. Joseph Health System, Humboldt), **http://www.humboldt1.com/~kkhic/index.html**
- **California:** Community Health Library of Los Gatos, **http://www.healthlib.org/orgresources.html**
- **California:** Consumer Health Program and Services (CHIPS) (County of Los Angeles Public Library, Los Angeles County Harbor-UCLA Medical Center Library) - Carson, CA, **http://www.colapublib.org/services/chips.html**
- **California:** Gateway Health Library (Sutter Gould Medical Foundation)
- **California:** Health Library (Stanford University Medical Center), **http://www-med.stanford.edu/healthlibrary/**
- **California:** Patient Education Resource Center - Health Information and Resources (University of California, San Francisco), **http://sfghdean.ucsf.edu/barnett/PERC/default.asp**
- **California:** Redwood Health Library (Petaluma Health Care District), **http://www.phcd.org/rdwdlib.html**
- **California:** Los Gatos PlaneTree Health Library, **http://planetreesanjose.org/**
- **California:** Sutter Resource Library (Sutter Hospitals Foundation, Sacramento), **http://suttermedicalcenter.org/library/**
- **California:** Health Sciences Libraries (University of California, Davis), **http://www.lib.ucdavis.edu/healthsci/**
- **California:** ValleyCare Health Library & Ryan Comer Cancer Resource Center (ValleyCare Health System, Pleasanton), **http://gaelnet.stmarys-ca.edu/other.libs/gbal/east/vchl.html**
- **California:** Washington Community Health Resource Library (Fremont), **http://www.healthlibrary.org/**
- **Colorado:** William V. Gervasini Memorial Library (Exempla Healthcare), **http://www.saintjosephdenver.org/yourhealth/libraries/**
- **Connecticut:** Hartford Hospital Health Science Libraries (Hartford Hospital), **http://www.harthosp.org/library/**
- **Connecticut:** Healthnet: Connecticut Consumer Health Information Center (University of Connecticut Health Center, Lyman Maynard Stowe Library), **http://library.uchc.edu/departm/hnet/**

[24] Abstracted from **http://www.nlm.nih.gov/medlineplus/libraries.html**.

- **Connecticut:** Waterbury Hospital Health Center Library (Waterbury Hospital, Waterbury), **http://www.waterburyhospital.com/library/consumer.shtml**
- **Delaware:** Consumer Health Library (Christiana Care Health System, Eugene du Pont Preventive Medicine & Rehabilitation Institute, Wilmington), **http://www.christianacare.org/health_guide/health_guide_pmri_health_info.cfm**
- **Delaware:** Lewis B. Flinn Library (Delaware Academy of Medicine, Wilmington), **http://www.delamed.org/chls.html**
- **Georgia:** Family Resource Library (Medical College of Georgia, Augusta), **http://cmc.mcg.edu/kids_families/fam_resources/fam_res_lib/frl.htm**
- **Georgia:** Health Resource Center (Medical Center of Central Georgia, Macon), **http://www.mccg.org/hrc/hrchome.asp**
- **Hawaii:** Hawaii Medical Library: Consumer Health Information Service (Hawaii Medical Library, Honolulu), **http://hml.org/CHIS/**
- **Idaho:** DeArmond Consumer Health Library (Kootenai Medical Center, Coeur d'Alene), **http://www.nicon.org/DeArmond/index.htm**
- **Illinois:** Health Learning Center of Northwestern Memorial Hospital (Chicago), **http://www.nmh.org/health_info/hlc.html**
- **Illinois:** Medical Library (OSF Saint Francis Medical Center, Peoria), **http://www.osfsaintfrancis.org/general/library/**
- **Kentucky:** Medical Library - Services for Patients, Families, Students & the Public (Central Baptist Hospital, Lexington), **http://www.centralbap.com/education/community/library.cfm**
- **Kentucky:** University of Kentucky - Health Information Library (Chandler Medical Center, Lexington), **http://www.mc.uky.edu/PatientEd/**
- **Louisiana:** Alton Ochsner Medical Foundation Library (Alton Ochsner Medical Foundation, New Orleans), **http://www.ochsner.org/library/**
- **Louisiana:** Louisiana State University Health Sciences Center Medical Library-Shreveport, **http://lib-sh.lsuhsc.edu/**
- **Maine:** Franklin Memorial Hospital Medical Library (Franklin Memorial Hospital, Farmington), **http://www.fchn.org/fmh/lib.htm**
- **Maine:** Gerrish-True Health Sciences Library (Central Maine Medical Center, Lewiston), **http://www.cmmc.org/library/library.html**
- **Maine:** Hadley Parrot Health Science Library (Eastern Maine Healthcare, Bangor), **http://www.emh.org/hll/hpl/guide.htm**
- **Maine:** Maine Medical Center Library (Maine Medical Center, Portland), **http://www.mmc.org/library/**
- **Maine:** Parkview Hospital (Brunswick), **http://www.parkviewhospital.org/**
- **Maine:** Southern Maine Medical Center Health Sciences Library (Southern Maine Medical Center, Biddeford), **http://www.smmc.org/services/service.php3?choice=10**
- **Maine:** Stephens Memorial Hospital's Health Information Library (Western Maine Health, Norway), **http://www.wmhcc.org/Library/**

- **Manitoba, Canada:** Consumer & Patient Health Information Service (University of Manitoba Libraries), **http://www.umanitoba.ca/libraries/units/health/reference/chis.html**
- **Manitoba, Canada:** J.W. Crane Memorial Library (Deer Lodge Centre, Winnipeg), **http://www.deerlodge.mb.ca/crane_library/about.asp**
- **Maryland:** Health Information Center at the Wheaton Regional Library (Montgomery County, Dept. of Public Libraries, Wheaton Regional Library), **http://www.mont.lib.md.us/healthinfo/hic.asp**
- **Massachusetts:** Baystate Medical Center Library (Baystate Health System), **http://www.baystatehealth.com/1024/**
- **Massachusetts:** Boston University Medical Center Alumni Medical Library (Boston University Medical Center), **http://med-libwww.bu.edu/library/lib.html**
- **Massachusetts:** Lowell General Hospital Health Sciences Library (Lowell General Hospital, Lowell), **http://www.lowellgeneral.org/library/HomePageLinks/WWW.htm**
- **Massachusetts:** Paul E. Woodard Health Sciences Library (New England Baptist Hospital, Boston), **http://www.nebh.org/health_lib.asp**
- **Massachusetts:** St. Luke's Hospital Health Sciences Library (St. Luke's Hospital, Southcoast Health System, New Bedford), **http://www.southcoast.org/library/**
- **Massachusetts:** Treadwell Library Consumer Health Reference Center (Massachusetts General Hospital), **http://www.mgh.harvard.edu/library/chrcindex.html**
- **Massachusetts:** UMass HealthNet (University of Massachusetts Medical School, Worchester), **http://healthnet.umassmed.edu/**
- **Michigan:** Botsford General Hospital Library - Consumer Health (Botsford General Hospital, Library & Internet Services), **http://www.botsfordlibrary.org/consumer.htm**
- **Michigan:** Helen DeRoy Medical Library (Providence Hospital and Medical Centers), **http://www.providence-hospital.org/library/**
- **Michigan:** Marquette General Hospital - Consumer Health Library (Marquette General Hospital, Health Information Center), **http://www.mgh.org/center.html**
- **Michigan:** Patient Education Resouce Center - University of Michigan Cancer Center (University of Michigan Comprehensive Cancer Center, Ann Arbor), **http://www.cancer.med.umich.edu/learn/leares.htm**
- **Michigan:** Sladen Library & Center for Health Information Resources - Consumer Health Information (Detroit), **http://www.henryford.com/body.cfm?id=39330**
- **Montana:** Center for Health Information (St. Patrick Hospital and Health Sciences Center, Missoula)
- **National:** Consumer Health Library Directory (Medical Library Association, Consumer and Patient Health Information Section), **http://caphis.mlanet.org/directory/index.html**
- **National:** National Network of Libraries of Medicine (National Library of Medicine) - provides library services for health professionals in the United States who do not have access to a medical library, **http://nnlm.gov/**
- **National:** NN/LM List of Libraries Serving the Public (National Network of Libraries of Medicine), **http://nnlm.gov/members/**

- **Nevada:** Health Science Library, West Charleston Library (Las Vegas-Clark County Library District, Las Vegas), **http://www.lvccld.org/special_collections/medical/index.htm**
- **New Hampshire:** Dartmouth Biomedical Libraries (Dartmouth College Library, Hanover), **http://www.dartmouth.edu/~biomed/resources.htmld/conshealth.htmld/**
- **New Jersey:** Consumer Health Library (Rahway Hospital, Rahway), **http://www.rahwayhospital.com/library.htm**
- **New Jersey:** Dr. Walter Phillips Health Sciences Library (Englewood Hospital and Medical Center, Englewood), **http://www.englewoodhospital.com/links/index.htm**
- **New Jersey:** Meland Foundation (Englewood Hospital and Medical Center, Englewood), **http://www.geocities.com/ResearchTriangle/9360/**
- **New York:** Choices in Health Information (New York Public Library) - NLM Consumer Pilot Project participant, **http://www.nypl.org/branch/health/links.html**
- **New York:** Health Information Center (Upstate Medical University, State University of New York, Syracuse), **http://www.upstate.edu/library/hic/**
- **New York:** Health Sciences Library (Long Island Jewish Medical Center, New Hyde Park), **http://www.lij.edu/library/library.html**
- **New York:** ViaHealth Medical Library (Rochester General Hospital), **http://www.nyam.org/library/**
- **Ohio:** Consumer Health Library (Akron General Medical Center, Medical & Consumer Health Library), **http://www.akrongeneral.org/hwlibrary.htm**
- **Oklahoma:** The Health Information Center at Saint Francis Hospital (Saint Francis Health System, Tulsa), **http://www.sfh-tulsa.com/services/healthinfo.asp**
- **Oregon:** Planetree Health Resource Center (Mid-Columbia Medical Center, The Dalles), **http://www.mcmc.net/phrc/**
- **Pennsylvania:** Community Health Information Library (Milton S. Hershey Medical Center, Hershey), **http://www.hmc.psu.edu/commhealth/**
- **Pennsylvania:** Community Health Resource Library (Geisinger Medical Center, Danville), **http://www.geisinger.edu/education/commlib.shtml**
- **Pennsylvania:** HealthInfo Library (Moses Taylor Hospital, Scranton), **http://www.mth.org/healthwellness.html**
- **Pennsylvania:** Hopwood Library (University of Pittsburgh, Health Sciences Library System, Pittsburgh), **http://www.hsls.pitt.edu/guides/chi/hopwood/index_html**
- **Pennsylvania:** Koop Community Health Information Center (College of Physicians of Philadelphia), **http://www.collphyphil.org/kooppg1.shtml**
- **Pennsylvania:** Learning Resources Center - Medical Library (Susquehanna Health System, Williamsport), **http://www.shscares.org/services/lrc/index.asp**
- **Pennsylvania:** Medical Library (UPMC Health System, Pittsburgh), **http://www.upmc.edu/passavant/library.htm**
- **Quebec, Canada:** Medical Library (Montreal General Hospital), **http://www.mghlib.mcgill.ca/**

- **South Dakota:** Rapid City Regional Hospital Medical Library (Rapid City Regional Hospital), **http://www.rcrh.org/Services/Library/Default.asp**
- **Texas:** Houston HealthWays (Houston Academy of Medicine-Texas Medical Center Library), **http://hhw.library.tmc.edu/**
- **Washington:** Community Health Library (Kittitas Valley Community Hospital), **http://www.kvch.com/**
- **Washington:** Southwest Washington Medical Center Library (Southwest Washington Medical Center, Vancouver), **http://www.swmedicalcenter.com/body.cfm?id=72**

ONLINE GLOSSARIES

The Internet provides access to a number of free-to-use medical dictionaries. The National Library of Medicine has compiled the following list of online dictionaries:

- ADAM Medical Encyclopedia (A.D.A.M., Inc.), comprehensive medical reference: **http://www.nlm.nih.gov/medlineplus/encyclopedia.html**
- MedicineNet.com Medical Dictionary (MedicineNet, Inc.): **http://www.medterms.com/Script/Main/hp.asp**
- Merriam-Webster Medical Dictionary (Inteli-Health, Inc.): **http://www.intelihealth.com/IH/**
- Multilingual Glossary of Technical and Popular Medical Terms in Eight European Languages (European Commission) - Danish, Dutch, English, French, German, Italian, Portuguese, and Spanish: **http://allserv.rug.ac.be/~rvdstich/eugloss/welcome.html**
- On-line Medical Dictionary (CancerWEB): **http://cancerweb.ncl.ac.uk/omd/**
- Rare Diseases Terms (Office of Rare Diseases): **http://ord.aspensys.com/asp/diseases/diseases.asp**
- Technology Glossary (National Library of Medicine) - Health Care Technology: **http://www.nlm.nih.gov/nichsr/ta101/ta10108.htm**

Beyond these, MEDLINEplus contains a very patient-friendly encyclopedia covering every aspect of medicine (licensed from A.D.A.M., Inc.). The ADAM Medical Encyclopedia can be accessed at **http://www.nlm.nih.gov/medlineplus/encyclopedia.html**. ADAM is also available on commercial Web sites such as drkoop.com (**http://www.drkoop.com/**) and Web MD (**http://my.webmd.com/adam/asset/adam_disease_articles/a_to_z/a**).

Online Dictionary Directories

The following are additional online directories compiled by the National Library of Medicine, including a number of specialized medical dictionaries:

- Medical Dictionaries: Medical & Biological (World Health Organization): **http://www.who.int/hlt/virtuallibrary/English/diction.htm#Medical**
- MEL-Michigan Electronic Library List of Online Health and Medical Dictionaries (Michigan Electronic Library): **http://mel.lib.mi.us/health/health-dictionaries.html**
- Patient Education: Glossaries (DMOZ Open Directory Project): **http://dmoz.org/Health/Education/Patient_Education/Glossaries/**
- Web of Online Dictionaries (Bucknell University): **http://www.yourdictionary.com/diction5.html#medicine**

CONTACT LENSES DICTIONARY

The definitions below are derived from official public sources, including the National Institutes of Health [NIH] and the European Union [EU].

Abrasion: 1. The wearing away of a substance or structure (such as the skin or the teeth) through some unusual or abnormal mechanical process. 2. An area of body surface denuded of skin or mucous membrane by some unusual or abnormal mechanical process. [EU]

Abscess: Accumulation of purulent material in tissues, organs, or circumscribed spaces, usually associated with signs of infection. [NIH]

Acanthamoeba: A genus of free-living soil amoebae that produces no flagellate stage. Its organisms are pathogens for several infections in humans and have been found in the eye, bone, brain, and respiratory tract. [NIH]

Acceptor: A substance which, while normally not oxidized by oxygen or reduced by hydrogen, can be oxidized or reduced in presence of a substance which is itself undergoing oxidation or reduction. [NIH]

Accommodation: Adjustment, especially that of the eye for various distances. [EU]

Acetone: A colorless liquid used as a solvent and an antiseptic. It is one of the ketone bodies produced during ketoacidosis. [NIH]

Acetylcysteine: The N-acetyl derivative of cysteine. It is used as a mucolytic agent to reduce the viscosity of mucous secretions. It has also been shown to have antiviral effects in patients with HIV due to inhibition of viral stimulation by reactive oxygen intermediates. [NIH]

Acrylamide: A colorless, odorless, highly water soluble vinyl monomer formed from the hydration of acrylonitrile. It is primarily used in research laboratories for electrophoresis, chromatography, and electron microscopy and in the sewage and wastewater treatment industries. [NIH]

Acrylonitrile: A highly poisonous compound used widely in the manufacture of plastics, adhesives and synthetic rubber. [NIH]

Acuity: Clarity or clearness, especially of the vision. [EU]

Acyl: Chemical signal used by bacteria to communicate. [NIH]

Adaptation: 1. The adjustment of an organism to its environment, or the process by which it enhances such fitness. 2. The normal ability of the eye to adjust itself to variations in the intensity of light; the adjustment to such variations. 3. The decline in the frequency of firing of a neuron, particularly of a receptor, under conditions of constant stimulation. 4. In dentistry, (a) the proper fitting of a denture, (b) the degree of proximity and interlocking of restorative material to a tooth preparation, (c) the exact adjustment of bands to teeth. 5. In microbiology, the adjustment of bacterial physiology to a new environment. [EU]

Adduct: Complex formed when a carcinogen combines with DNA or a protein. [NIH]

Adenosine: A nucleoside that is composed of adenine and d-ribose. Adenosine or adenosine derivatives play many important biological roles in addition to being components of DNA and RNA. Adenosine itself is a neurotransmitter. [NIH]

Adhesives: Substances that cause the adherence of two surfaces. They include glues (properly collagen-derived adhesives), mucilages, sticky pastes, gums, resins, or latex. [NIH]

Adjustment: The dynamic process wherein the thoughts, feelings, behavior, and

biophysiological mechanisms of the individual continually change to adjust to the environment. [NIH]

Adsorption: The condensation of gases, liquids, or dissolved substances on the surfaces of solids. It includes adsorptive phenomena of bacteria and viruses as well as of tissues treated with exogenous drugs and chemicals. [NIH]

Adsorptive: It captures volatile compounds by binding them to agents such as activated carbon or adsorptive resins. [NIH]

Adverse Effect: An unwanted side effect of treatment. [NIH]

Aeromedical: Pertaining to aviation medicine. [NIH]

Affinity: 1. Inherent likeness or relationship. 2. A special attraction for a specific element, organ, or structure. 3. Chemical affinity; the force that binds atoms in molecules; the tendency of substances to combine by chemical reaction. 4. The strength of noncovalent chemical binding between two substances as measured by the dissociation constant of the complex. 5. In immunology, a thermodynamic expression of the strength of interaction between a single antigen-binding site and a single antigenic determinant (and thus of the stereochemical compatibility between them), most accurately applied to interactions among simple, uniform antigenic determinants such as haptens. Expressed as the association constant (K litres mole -1), which, owing to the heterogeneity of affinities in a population of antibody molecules of a given specificity, actually represents an average value (mean intrinsic association constant). 6. The reciprocal of the dissociation constant. [EU]

Aggravation: An increasing in seriousness or severity; an act or circumstance that intensifies, or makes worse. [EU]

Albumin: 1. Any protein that is soluble in water and moderately concentrated salt solutions and is coagulable by heat. 2. Serum albumin; the major plasma protein (approximately 60 per cent of the total), which is responsible for much of the plasma colloidal osmotic pressure and serves as a transport protein carrying large organic anions, such as fatty acids, bilirubin, and many drugs, and also carrying certain hormones, such as cortisol and thyroxine, when their specific binding globulins are saturated. Albumin is synthesized in the liver. Low serum levels occur in protein malnutrition, active inflammation and serious hepatic and renal disease. [EU]

Alkaline: Having the reactions of an alkali. [EU]

Allergen: An antigenic substance capable of producing immediate-type hypersensitivity (allergy). [EU]

Alloys: A mixture of metallic elements or compounds with other metallic or metalloid elements in varying proportions. [NIH]

Alpha Particles: Positively charged particles composed of two protons and two neutrons, i.e., helium nuclei, emitted during disintegration of very heavy isotopes; a beam of alpha particles or an alpha ray has very strong ionizing power, but weak penetrability. [NIH]

Alternative medicine: Practices not generally recognized by the medical community as standard or conventional medical approaches and used instead of standard treatments. Alternative medicine includes the taking of dietary supplements, megadose vitamins, and herbal preparations; the drinking of special teas; and practices such as massage therapy, magnet therapy, spiritual healing, and meditation. [NIH]

Aluminum: A metallic element that has the atomic number 13, atomic symbol Al, and atomic weight 26.98. [NIH]

Amblyopia: A nonspecific term referring to impaired vision. Major subcategories include stimulus deprivation-induced amblyopia and toxic amblyopia. Stimulus deprivation-

induced amblopia is a developmental disorder of the visual cortex. A discrepancy between visual information received by the visual cortex from each eye results in abnormal cortical development. Strabismus and refractive errors may cause this condition. Toxic amblyopia is a disorder of the optic nerve which is associated with alcoholism, tobacco smoking, and other toxins and as an adverse effect of the use of some medications. [NIH]

Ameliorating: A changeable condition which prevents the consequence of a failure or accident from becoming as bad as it otherwise would. [NIH]

Amino acid: Any organic compound containing an amino (-NH2 and a carboxyl (- COOH) group. The 20 a-amino acids listed in the accompanying table are the amino acids from which proteins are synthesized by formation of peptide bonds during ribosomal translation of messenger RNA; all except glycine, which is not optically active, have the L configuration. Other amino acids occurring in proteins, such as hydroxyproline in collagen, are formed by posttranslational enzymatic modification of amino acids residues in polypeptide chains. There are also several important amino acids, such as the neurotransmitter y-aminobutyric acid, that have no relation to proteins. Abbreviated AA. [EU]

Amino Acid Sequence: The order of amino acids as they occur in a polypeptide chain. This is referred to as the primary structure of proteins. It is of fundamental importance in determining protein conformation. [NIH]

Amiodarone: An antianginal and antiarrhythmic drug. It increases the duration of ventricular and atrial muscle action by inhibiting Na,K-activated myocardial adenosine triphosphatase. There is a resulting decrease in heart rate and in vascular resistance. [NIH]

Ammonia: A colorless alkaline gas. It is formed in the body during decomposition of organic materials during a large number of metabolically important reactions. [NIH]

Ammonium Compounds: Inorganic and organic compounds that contain the hypothetical radical NH4. [NIH]

Amplification: The production of additional copies of a chromosomal DNA sequence, found as either intrachromosomal or extrachromosomal DNA. [NIH]

Amylase: An enzyme that helps the body digest starches. [NIH]

Anaesthesia: Loss of feeling or sensation. Although the term is used for loss of tactile sensibility, or of any of the other senses, it is applied especially to loss of the sensation of pain, as it is induced to permit performance of surgery or other painful procedures. [EU]

Anal: Having to do with the anus, which is the posterior opening of the large bowel. [NIH]

Analog: In chemistry, a substance that is similar, but not identical, to another. [NIH]

Anaphylatoxins: The family of peptides C3a, C4a, C5a, and C5a des-arginine produced in the serum during complement activation. They produce smooth muscle contraction, mast cell histamine release, affect platelet aggregation, and act as mediators of the local inflammatory process. The order of anaphylatoxin activity from strongest to weakest is C5a, C3a, C4a, and C5a des-arginine. The latter is the so-called "classical" anaphylatoxin but shows no spasmogenic activity though it contains some chemotactic ability. [NIH]

Anatomical: Pertaining to anatomy, or to the structure of the organism. [EU]

Anemia: A reduction in the number of circulating erythrocytes or in the quantity of hemoglobin. [NIH]

Angiography: Radiography of blood vessels after injection of a contrast medium. [NIH]

Anionic: Pertaining to or containing an anion. [EU]

Anions: Negatively charged atoms, radicals or groups of atoms which travel to the anode or positive pole during electrolysis. [NIH]

Aniridia: A congenital abnormality in which there is only a rudimentary iris. This is due to the failure of the optic cup to grow. Aniridia also occurs in a hereditary form, usually autosomal dominant. [NIH]

Anisometropia: A condition of an inequality of refractive power of the two eyes. [NIH]

Anomalies: Birth defects; abnormalities. [NIH]

Anterior chamber: The space in front of the iris and behind the cornea. [NIH]

Antianginal: Counteracting angina or anginal conditions. [EU]

Antiarrhythmic: An agent that prevents or alleviates cardiac arrhythmia. [EU]

Antibacterial: A substance that destroys bacteria or suppresses their growth or reproduction. [EU]

Antibiotic: A drug used to treat infections caused by bacteria and other microorganisms. [NIH]

Antibodies: Immunoglobulin molecules having a specific amino acid sequence by virtue of which they interact only with the antigen that induced their synthesis in cells of the lymphoid series (especially plasma cells), or with an antigen closely related to it. [NIH]

Antibody: A type of protein made by certain white blood cells in response to a foreign substance (antigen). Each antibody can bind to only a specific antigen. The purpose of this binding is to help destroy the antigen. Antibodies can work in several ways, depending on the nature of the antigen. Some antibodies destroy antigens directly. Others make it easier for white blood cells to destroy the antigen. [NIH]

Anticoagulant: A drug that helps prevent blood clots from forming. Also called a blood thinner. [NIH]

Antigen: Any substance which is capable, under appropriate conditions, of inducing a specific immune response and of reacting with the products of that response, that is, with specific antibody or specifically sensitized T-lymphocytes, or both. Antigens may be soluble substances, such as toxins and foreign proteins, or particulate, such as bacteria and tissue cells; however, only the portion of the protein or polysaccharide molecule known as the antigenic determinant (q.v.) combines with antibody or a specific receptor on a lymphocyte. Abbreviated Ag. [EU]

Antigen-Antibody Complex: The complex formed by the binding of antigen and antibody molecules. The deposition of large antigen-antibody complexes leading to tissue damage causes immune complex diseases. [NIH]

Anti-infective: An agent that so acts. [EU]

Anti-inflammatory: Having to do with reducing inflammation. [NIH]

Antimicrobial: Killing microorganisms, or suppressing their multiplication or growth. [EU]

Antioxidant: A substance that prevents damage caused by free radicals. Free radicals are highly reactive chemicals that often contain oxygen. They are produced when molecules are split to give products that have unpaired electrons. This process is called oxidation. [NIH]

Antiseptic: A substance that inhibits the growth and development of microorganisms without necessarily killing them. [EU]

Antiviral: Destroying viruses or suppressing their replication. [EU]

Aperture: A natural hole of perforation, especially one in a bone. [NIH]

Aphakia: Absence of crystalline lens totally or partially from field of vision, from any cause except after cataract extraction. Aphakia is mainly congenital or as result of lens dislocation and subluxation. [NIH]

Approximate: Approximal [EU]

Aqueous: Having to do with water. [NIH]

Aqueous fluid: Clear, watery fluid that flows between and nourishes the lens and the cornea; secreted by the ciliary processes. [NIH]

Aromatic: Having a spicy odour. [EU]

Arterial: Pertaining to an artery or to the arteries. [EU]

Arteries: The vessels carrying blood away from the heart. [NIH]

Arterioles: The smallest divisions of the arteries located between the muscular arteries and the capillaries. [NIH]

Artery: Vessel-carrying blood from the heart to various parts of the body. [NIH]

Artificial Eye: Usually made of artificial plastic material or glass to which small quantities of metallic oxides have been added in order to imitate the features and coloring of the various parts of t he human eye; a prosthesis made of glass, plastic, or similar material. [NIH]

Ascorbic Acid: A six carbon compound related to glucose. It is found naturally in citrus fruits and many vegetables. Ascorbic acid is an essential nutrient in human diets, and necessary to maintain connective tissue and bone. Its biologically active form, vitamin C, functions as a reducing agent and coenzyme in several metabolic pathways. Vitamin C is considered an antioxidant. [NIH]

Aseptic: Free from infection or septic material; sterile. [EU]

Assay: Determination of the amount of a particular constituent of a mixture, or of the biological or pharmacological potency of a drug. [EU]

Astigmatism: A condition in which the surface of the cornea is not spherical; causes a blurred image to be received at the retina. [NIH]

Astringents: Agents, usually topical, that cause the contraction of tissues for the control of bleeding or secretions. [NIH]

Asymptomatic: Having no signs or symptoms of disease. [NIH]

Atmospheric Pressure: The pressure at any point in an atmosphere due solely to the weight of the atmospheric gases above the point concerned. [NIH]

Atopic: Pertaining to an atopen or to atopy; allergic. [EU]

Atrial: Pertaining to an atrium. [EU]

Atrioventricular: Pertaining to an atrium of the heart and to a ventricle. [EU]

Atrium: A chamber; used in anatomical nomenclature to designate a chamber affording entrance to another structure or organ. Usually used alone to designate an atrium of the heart. [EU]

Auditory: Pertaining to the sense of hearing. [EU]

Autoclave: Apparatus using superheated steam under pressure. [NIH]

Autodigestion: Autolysis; a condition found in disease of the stomach: the stomach wall is digested by the gastric juice. [NIH]

Axons: Nerve fibers that are capable of rapidly conducting impulses away from the neuron cell body. [NIH]

Bacteria: Unicellular prokaryotic microorganisms which generally possess rigid cell walls, multiply by cell division, and exhibit three principal forms: round or coccal, rodlike or bacillary, and spiral or spirochetal. [NIH]

Bacterial Adhesion: Physicochemical property of fimbriated and non-fimbriated bacteria of

attaching to cells, tissue, and nonbiological surfaces. It is a factor in bacterial colonization and pathogenicity. [NIH]

Bacterial Infections: Infections by bacteria, general or unspecified. [NIH]

Bacterial Physiology: Physiological processes and activities of bacteria. [NIH]

Bactericidal: Substance lethal to bacteria; substance capable of killing bacteria. [NIH]

Bactericide: An agent that destroys bacteria. [EU]

Bacteriophage: A virus whose host is a bacterial cell; A virus that exclusively infects bacteria. It generally has a protein coat surrounding the genome (DNA or RNA). One of the coliphages most extensively studied is the lambda phage, which is also one of the most important. [NIH]

Bacteriuria: The presence of bacteria in the urine with or without consequent urinary tract infection. Since bacteriuria is a clinical entity, the term does not preclude the use of urine/microbiology for technical discussions on the isolation and segregation of bacteria in the urine. [NIH]

Base: In chemistry, the nonacid part of a salt; a substance that combines with acids to form salts; a substance that dissociates to give hydroxide ions in aqueous solutions; a substance whose molecule or ion can combine with a proton (hydrogen ion); a substance capable of donating a pair of electrons (to an acid) for the formation of a coordinate covalent bond. [EU]

Benzyl Alcohol: A colorless liquid with a sharp burning taste and slight odor. It is used as a local anesthetic and to reduce pain associated with lidocaine injection. Also, it is used in the manufacture of other benzyl compounds, as a pharmaceutic aid, and in perfumery and flavoring. [NIH]

Beta-glucans: Polysaccharides made by several types of mushrooms. Beta-glucans have been used to treat patients with gastric cancer and colorectal cancer. They may be able to stimulate the immune system. [NIH]

Bilateral: Affecting both the right and left side of body. [NIH]

Bile: An emulsifying agent produced in the liver and secreted into the duodenum. Its composition includes bile acids and salts, cholesterol, and electrolytes. It aids digestion of fats in the duodenum. [NIH]

Bilirubin: A bile pigment that is a degradation product of heme. [NIH]

Biological response modifier: BRM. A substance that stimulates the body's response to infection and disease. [NIH]

Biotic: Pertaining to living organisms in their ecological rather than their physiological relations. [NIH]

Bladder: The organ that stores urine. [NIH]

Blebs: Cysts on or near the surface of the lungs. [NIH]

Blepharitis: Inflammation of the eyelids. [NIH]

Blinking: Brief closing of the eyelids by involuntary normal periodic closing, as a protective measure, or by voluntary action. [NIH]

Blister: Visible accumulations of fluid within or beneath the epidermis. [NIH]

Blister pack: A package consisting of a clear plastic overlay affixed to a cardboard backing for protecting and displaying a product. [EU]

Blood Coagulation: The process of the interaction of blood coagulation factors that results in an insoluble fibrin clot. [NIH]

Blood pressure: The pressure of blood against the walls of a blood vessel or heart chamber.

Unless there is reference to another location, such as the pulmonary artery or one of the heart chambers, it refers to the pressure in the systemic arteries, as measured, for example, in the forearm. [NIH]

Blood vessel: A tube in the body through which blood circulates. Blood vessels include a network of arteries, arterioles, capillaries, venules, and veins. [NIH]

Body Fluids: Liquid components of living organisms. [NIH]

Bone Cements: Adhesives used to fix prosthetic devices to bones and to cement bone to bone in difficult fractures. Synthetic resins are commonly used as cements. A mixture of monocalcium phosphate, monohydrate, alpha-tricalcium phosphate, and calcium carbonate with a sodium phosphate solution is also a useful bone paste. [NIH]

Bone Marrow: The soft tissue filling the cavities of bones. Bone marrow exists in two types, yellow and red. Yellow marrow is found in the large cavities of large bones and consists mostly of fat cells and a few primitive blood cells. Red marrow is a hematopoietic tissue and is the site of production of erythrocytes and granular leukocytes. Bone marrow is made up of a framework of connective tissue containing branching fibers with the frame being filled with marrow cells. [NIH]

Borates: Inorganic or organic salts and esters of boric acid. [NIH]

Bowel: The long tube-shaped organ in the abdomen that completes the process of digestion. There is both a small and a large bowel. Also called the intestine. [NIH]

Bowel Movement: Body wastes passed through the rectum and anus. [NIH]

Branch: Most commonly used for branches of nerves, but applied also to other structures. [NIH]

Breakdown: A physical, metal, or nervous collapse. [NIH]

Breeding: The science or art of changing the constitution of a population of plants or animals through sexual reproduction. [NIH]

Bromelain: An enzyme found in pineapples that breaks down other proteins, such as collagen and muscle fiber, and has anti-inflammatory properties. It is used as a meat tenderizer in the food industry. [NIH]

Bullous: Pertaining to or characterized by bullae. [EU]

Burns: Injuries to tissues caused by contact with heat, steam, chemicals (burns, chemical), electricity (burns, electric), or the like. [NIH]

Burns, Electric: Burns produced by contact with electric current or from a sudden discharge of electricity. [NIH]

Calcium: A basic element found in nearly all organized tissues. It is a member of the alkaline earth family of metals with the atomic symbol Ca, atomic number 20, and atomic weight 40. Calcium is the most abundant mineral in the body and combines with phosphorus to form calcium phosphate in the bones and teeth. It is essential for the normal functioning of nerves and muscles and plays a role in blood coagulation (as factor IV) and in many enzymatic processes. [NIH]

Capillary: Any one of the minute vessels that connect the arterioles and venules, forming a network in nearly all parts of the body. Their walls act as semipermeable membranes for the interchange of various substances, including fluids, between the blood and tissue fluid; called also vas capillare. [EU]

Capsules: Hard or soft soluble containers used for the oral administration of medicine. [NIH]

Carbenicillin: Broad-spectrum semisynthetic penicillin derivative used parenterally. It is susceptible to gastric juice and penicillinase and may damage platelet function. [NIH]

Carbohydrate: An aldehyde or ketone derivative of a polyhydric alcohol, particularly of the pentahydric and hexahydric alcohols. They are so named because the hydrogen and oxygen are usually in the proportion to form water, (CH2O)n. The most important carbohydrates are the starches, sugars, celluloses, and gums. They are classified into mono-, di-, tri-, poly- and heterosaccharides. [EU]

Carbon Dioxide: A colorless, odorless gas that can be formed by the body and is necessary for the respiration cycle of plants and animals. [NIH]

Carboxy: Cannabinoid. [NIH]

Carboxylic Acids: Organic compounds containing the carboxy group (-COOH). This group of compounds includes amino acids and fatty acids. Carboxylic acids can be saturated, unsaturated, or aromatic. [NIH]

Carcinogen: Any substance that causes cancer. [NIH]

Carcinogenic: Producing carcinoma. [EU]

Cardiac: Having to do with the heart. [NIH]

Carotene: The general name for a group of pigments found in green, yellow, and leafy vegetables, and yellow fruits. The pigments are fat-soluble, unsaturated aliphatic hydrocarbons functioning as provitamins and are converted to vitamin A through enzymatic processes in the intestinal wall. [NIH]

Case report: A detailed report of the diagnosis, treatment, and follow-up of an individual patient. Case reports also contain some demographic information about the patient (for example, age, gender, ethnic origin). [NIH]

Case series: A group or series of case reports involving patients who were given similar treatment. Reports of case series usually contain detailed information about the individual patients. This includes demographic information (for example, age, gender, ethnic origin) and information on diagnosis, treatment, response to treatment, and follow-up after treatment. [NIH]

Catalase: An oxidoreductase that catalyzes the conversion of hydrogen peroxide to water and oxygen. It is present in many animal cells. A deficiency of this enzyme results in acatalasia. EC 1.11.1.6. [NIH]

Cataract: An opacity, partial or complete, of one or both eyes, on or in the lens or capsule, especially an opacity impairing vision or causing blindness. The many kinds of cataract are classified by their morphology (size, shape, location) or etiology (cause and time of occurrence). [EU]

Cations: Postively charged atoms, radicals or groups of atoms which travel to the cathode or negative pole during electrolysis. [NIH]

Caudal: Denoting a position more toward the cauda, or tail, than some specified point of reference; same as inferior, in human anatomy. [EU]

Cell: The individual unit that makes up all of the tissues of the body. All living things are made up of one or more cells. [NIH]

Cell Division: The fission of a cell. [NIH]

Cell membrane: Cell membrane = plasma membrane. The structure enveloping a cell, enclosing the cytoplasm, and forming a selective permeability barrier; it consists of lipids, proteins, and some carbohydrates, the lipids thought to form a bilayer in which integral proteins are embedded to varying degrees. [EU]

Cell Respiration: The metabolic process of all living cells (animal and plant) in which oxygen is used to provide a source of energy for the cell. [NIH]

Cell Size: The physical dimensions of a cell. It refers mainly to changes in dimensions correlated with physiological or pathological changes in cells. [NIH]

Cellobiose: A disaccharide consisting of two glucose units in beta (1-4) glycosidic linkage. Obtained from the partial hydrolysis of cellulose. [NIH]

Cellulase: An enzyme isolated from fungi and bacteria. It catalyzes the endohydrolysis of 1,4-beta-glucosidic linkages in cellulose, lichenin, and cereal beta-glucans. EC 3.2.1.4. [NIH]

Cellulose: A polysaccharide with glucose units linked as in cellobiose. It is the chief constituent of plant fibers, cotton being the purest natural form of the substance. As a raw material, it forms the basis for many derivatives used in chromatography, ion exchange materials, explosives manufacturing, and pharmaceutical preparations. [NIH]

Central Nervous System: The main information-processing organs of the nervous system, consisting of the brain, spinal cord, and meninges. [NIH]

Ceroid: A naturally occurring lipid pigment with histochemical characteristics similar to lipofuscin. It accumulates in various tissues in certain experimental and pathological conditions. [NIH]

Character: In current usage, approximately equivalent to personality. The sum of the relatively fixed personality traits and habitual modes of response of an individual. [NIH]

Chelating Agents: Organic chemicals that form two or more coordination bonds with a central metal ion. Heterocyclic rings are formed with the central metal atom as part of the ring. Some biological systems form metal chelates, e.g., the iron-binding porphyrin group of hemoglobin and the magnesium-binding chlorophyll of plants. (From Hawley's Condensed Chemical Dictionary, 12th ed) They are used chemically to remove ions from solutions, medicinally against microorganisms, to treat metal poisoning, and in chemotherapy protocols. [NIH]

Chemical Warfare: Tactical warfare using incendiary mixtures, smokes, or irritant, burning, or asphyxiating gases. [NIH]

Chemical Warfare Agents: Chemicals that are used to cause the disturbance, disease, or death of humans during war. [NIH]

Chemotactic Factors: Chemical substances that attract or repel cells or organisms. The concept denotes especially those factors released as a result of tissue injury, invasion, or immunologic activity, that attract leukocytes, macrophages, or other cells to the site of infection or insult. [NIH]

Chemotherapy: Treatment with anticancer drugs. [NIH]

Chin: The anatomical frontal portion of the mandible, also known as the mentum, that contains the line of fusion of the two separate halves of the mandible (symphysis menti). This line of fusion divides inferiorly to enclose a triangular area called the mental protuberance. On each side, inferior to the second premolar tooth, is the mental foramen for the passage of blood vessels and a nerve. [NIH]

Chlorhexidine: Disinfectant and topical anti-infective agent used also as mouthwash to prevent oral plaque. [NIH]

Chlorine: A greenish-yellow, diatomic gas that is a member of the halogen family of elements. It has the atomic symbol Cl, atomic number 17, and atomic weight 70.906. It is a powerful irritant that can cause fatal pulmonary edema. Chlorine is used in manufacturing, as a reagent in synthetic chemistry, for water purification, and in the production of chlorinated lime, which is used in fabric bleaching. [NIH]

Chlorophyll: Porphyrin derivatives containing magnesium that act to convert light energy in photosynthetic organisms. [NIH]

Cholesterol: The principal sterol of all higher animals, distributed in body tissues, especially the brain and spinal cord, and in animal fats and oils. [NIH]

Chorioretinitis: Inflammation of the choroid in which the sensory retina becomes edematous and opaque. The inflammatory cells and exudate may burst through the sensory retina to cloud the vitreous body. [NIH]

Choroid: The thin, highly vascular membrane covering most of the posterior of the eye between the retina and sclera. [NIH]

Chromosomal: Pertaining to chromosomes. [EU]

Chromosome: Part of a cell that contains genetic information. Except for sperm and eggs, all human cells contain 46 chromosomes. [NIH]

Chronic: A disease or condition that persists or progresses over a long period of time. [NIH]

Chymopapain: A cysteine endopeptidase isolated from papaya latex. Preferential cleavage at glutamic and aspartic acid residues. EC 3.4.22.6. [NIH]

Ciliary: Inflammation or infection of the glands of the margins of the eyelids. [NIH]

Ciliary Body: A ring of tissue extending from the scleral spur to the ora serrata of the retina. It consists of the uveal portion and the epithelial portion. The ciliary muscle is in the uveal portion and the ciliary processes are in the epithelial portion. [NIH]

Ciliary Neurotrophic Factor: A neurotrophic factor that promotes the survival of various neuronal cell types and may play an important role in the injury response in the nervous system. [NIH]

Ciliary processes: The extensions or projections of the ciliary body that secrete aqueous humor. [NIH]

Ciprofloxacin: A carboxyfluoroquinoline antimicrobial agent that is effective against a wide range of microorganisms. It has been successfully and safely used in the treatment of resistant respiratory, skin, bone, joint, gastrointestinal, urinary, and genital infections. [NIH]

CIS: Cancer Information Service. The CIS is the National Cancer Institute's link to the public, interpreting and explaining research findings in a clear and understandable manner, and providing personalized responses to specific questions about cancer. Access the CIS by calling 1-800-4-CANCER, or by using the Web site at http://cis.nci.nih.gov. [NIH]

Citrus: Any tree or shrub of the Rue family or the fruit of these plants. [NIH]

Clear cell carcinoma: A rare type of tumor of the female genital tract in which the inside of the cells looks clear when viewed under a microscope. [NIH]

Clinical Medicine: The study and practice of medicine by direct examination of the patient. [NIH]

Clinical study: A research study in which patients receive treatment in a clinic or other medical facility. Reports of clinical studies can contain results for single patients (case reports) or many patients (case series or clinical trials). [NIH]

Clinical trial: A research study that tests how well new medical treatments or other interventions work in people. Each study is designed to test new methods of screening, prevention, diagnosis, or treatment of a disease. [NIH]

Coagulation: 1. The process of clot formation. 2. In colloid chemistry, the solidification of a sol into a gelatinous mass; an alteration of a disperse phase or of a dissolved solid which causes the separation of the system into a liquid phase and an insoluble mass called the clot or curd. Coagulation is usually irreversible. 3. In surgery, the disruption of tissue by physical means to form an amorphous residuum, as in electrocoagulation and photocoagulation. [EU]

Cobalt: A trace element that is a component of vitamin B12. It has the atomic symbol Co, atomic number 27, and atomic weight 58.93. It is used in nuclear weapons, alloys, and pigments. Deficiency in animals leads to anemia; its excess in humans can lead to erythrocytosis. [NIH]

Cochlea: The part of the internal ear that is concerned with hearing. It forms the anterior part of the labyrinth, is conical, and is placed almost horizontally anterior to the vestibule. [NIH]

Cochlear: Of or pertaining to the cochlea. [EU]

Cochlear Implants: Electronic devices implanted beneath the skin with electrodes to the cochlear nerve to create sound sensation in persons with sensorineural deafness. [NIH]

Cochlear Nerve: The cochlear part of the 8th cranial nerve (vestibulocochlear nerve). The cochlear nerve fibers originate from neurons of the spiral ganglion and project peripherally to cochlear hair cells and centrally to the cochlear nuclei (cochlear nucleus) of the brain stem. They mediate the sense of hearing. [NIH]

Coenzyme: An organic nonprotein molecule, frequently a phosphorylated derivative of a water-soluble vitamin, that binds with the protein molecule (apoenzyme) to form the active enzyme (holoenzyme). [EU]

Cofactor: A substance, microorganism or environmental factor that activates or enhances the action of another entity such as a disease-causing agent. [NIH]

Collagen: A polypeptide substance comprising about one third of the total protein in mammalian organisms. It is the main constituent of skin, connective tissue, and the organic substance of bones and teeth. Different forms of collagen are produced in the body but all consist of three alpha-polypeptide chains arranged in a triple helix. Collagen is differentiated from other fibrous proteins, such as elastin, by the content of proline, hydroxyproline, and hydroxylysine; by the absence of tryptophan; and particularly by the high content of polar groups which are responsible for its swelling properties. [NIH]

Collapse: 1. A state of extreme prostration and depression, with failure of circulation. 2. Abnormal falling in of the walls of any part of organ. [EU]

Colloidal: Of the nature of a colloid. [EU]

Comatose: Pertaining to or affected with coma. [EU]

Communicable disease: A disease that can be transmitted by contact between persons. [NIH]

Complement: A term originally used to refer to the heat-labile factor in serum that causes immune cytolysis, the lysis of antibody-coated cells, and now referring to the entire functionally related system comprising at least 20 distinct serum proteins that is the effector not only of immune cytolysis but also of other biologic functions. Complement activation occurs by two different sequences, the classic and alternative pathways. The proteins of the classic pathway are termed 'components of complement' and are designated by the symbols C1 through C9. C1 is a calcium-dependent complex of three distinct proteins C1q, C1r and C1s. The proteins of the alternative pathway (collectively referred to as the properdin system) and complement regulatory proteins are known by semisystematic or trivial names. Fragments resulting from proteolytic cleavage of complement proteins are designated with lower-case letter suffixes, e.g., C3a. Inactivated fragments may be designated with the suffix 'i', e.g. C3bi. Activated components or complexes with biological activity are designated by a bar over the symbol e.g. C1 or C4b,2a. The classic pathway is activated by the binding of C1 to classic pathway activators, primarily antigen-antibody complexes containing IgM, IgG1, IgG3; C1q binds to a single IgM molecule or two adjacent IgG molecules. The alternative pathway can be activated by IgA immune complexes and also by nonimmunologic materials

including bacterial endotoxins, microbial polysaccharides, and cell walls. Activation of the classic pathway triggers an enzymatic cascade involving C1, C4, C2 and C3; activation of the alternative pathway triggers a cascade involving C3 and factors B, D and P. Both result in the cleavage of C5 and the formation of the membrane attack complex. Complement activation also results in the formation of many biologically active complement fragments that act as anaphylatoxins, opsonins, or chemotactic factors. [EU]

Complementary and alternative medicine: CAM. Forms of treatment that are used in addition to (complementary) or instead of (alternative) standard treatments. These practices are not considered standard medical approaches. CAM includes dietary supplements, megadose vitamins, herbal preparations, special teas, massage therapy, magnet therapy, spiritual healing, and meditation. [NIH]

Complementary medicine: Practices not generally recognized by the medical community as standard or conventional medical approaches and used to enhance or complement the standard treatments. Complementary medicine includes the taking of dietary supplements, megadose vitamins, and herbal preparations; the drinking of special teas; and practices such as massage therapy, magnet therapy, spiritual healing, and meditation. [NIH]

Compliance: Distensibility measure of a chamber such as the lungs (lung compliance) or bladder. Compliance is expressed as a change in volume per unit change in pressure. [NIH]

Computational Biology: A field of biology concerned with the development of techniques for the collection and manipulation of biological data, and the use of such data to make biological discoveries or predictions. This field encompasses all computational methods and theories applicable to molecular biology and areas of computer-based techniques for solving biological problems including manipulation of models and datasets. [NIH]

Concentric: Having a common center of curvature or symmetry. [NIH]

Concomitant: Accompanying; accessory; joined with another. [EU]

Cone: One of the special retinal receptor elements which are presumed to be primarily concerned with perception of light and color stimuli when the eye is adapted to light. [NIH]

Congestion: Excessive or abnormal accumulation of blood in a part. [EU]

Conjunctiva: The mucous membrane that lines the inner surface of the eyelids and the anterior part of the sclera. [NIH]

Conjunctivitis: Inflammation of the conjunctiva, generally consisting of conjunctival hyperaemia associated with a discharge. [EU]

Connective Tissue: Tissue that supports and binds other tissues. It consists of connective tissue cells embedded in a large amount of extracellular matrix. [NIH]

Connective Tissue: Tissue that supports and binds other tissues. It consists of connective tissue cells embedded in a large amount of extracellular matrix. [NIH]

Connective Tissue Cells: A group of cells that includes fibroblasts, cartilage cells, adipocytes, smooth muscle cells, and bone cells. [NIH]

Constitutional: 1. Affecting the whole constitution of the body; not local. 2. Pertaining to the constitution. [EU]

Consumption: Pulmonary tuberculosis. [NIH]

Contact dermatitis: Inflammation of the skin with varying degrees of erythema, edema and vesinculation resulting from cutaneous contact with a foreign substance or other exposure. [NIH]

Contact Lens Solutions: Sterile solutions used to clean and disinfect contact lenses. [NIH]

Contamination: The soiling or pollution by inferior material, as by the introduction of

organisms into a wound, or sewage into a stream. [EU]

Contraindications: Any factor or sign that it is unwise to pursue a certain kind of action or treatment, e. g. giving a general anesthetic to a person with pneumonia. [NIH]

Contrast medium: A substance that is introduced into or around a structure and, because of the difference in absorption of x-rays by the contrast medium and the surrounding tissues, allows radiographic visualization of the structure. [EU]

Contrast Sensitivity: The ability to detect sharp boundaries (stimuli) and to detect slight changes in luminance at regions without distinct contours. Psychophysical measurements of this visual function are used to evaluate visual acuity and to detect eye disease. [NIH]

Coordination: Muscular or motor regulation or the harmonious cooperation of muscles or groups of muscles, in a complex action or series of actions. [NIH]

Cor: The muscular organ that maintains the circulation of the blood. c. adiposum a heart that has undergone fatty degeneration or that has an accumulation of fat around it; called also fat or fatty, heart. c. arteriosum the left side of the heart, so called because it contains oxygenated (arterial) blood. c. biloculare a congenital anomaly characterized by failure of formation of the atrial and ventricular septums, the heart having only two chambers, a single atrium and a single ventricle, and a common atrioventricular valve. c. bovinum (L. 'ox heart') a greatly enlarged heart due to a hypertrophied left ventricle; called also c. taurinum and bucardia. c. dextrum (L. 'right heart') the right atrium and ventricle. c. hirsutum, c. villosum. c. mobile (obs.) an abnormally movable heart. c. pendulum a heart so movable that it seems to be hanging by the great blood vessels. c. pseudotriloculare biatriatum a congenital cardiac anomaly in which the heart functions as a three-chambered heart because of tricuspid atresia, the right ventricle being extremely small or rudimentary and the right atrium greatly dilated. Blood passes from the right to the left atrium and thence disease due to pulmonary hypertension secondary to disease of the lung, or its blood vessels, with hypertrophy of the right ventricle. [EU]

Cornea: The transparent part of the eye that covers the iris and the pupil and allows light to enter the inside. [NIH]

Corneal Diseases: Diseases of the cornea. [NIH]

Corneal Edema: An excessive amount of fluid in the cornea due to damage of the epithelium or endothelium causing decreased visual acuity. [NIH]

Corneal Stroma: The lamellated connective tissue constituting the thickest layer of the cornea between the Bowman and Descemet membranes. [NIH]

Corneal Topography: Measurement of the anterior surface of the cornea, its curvature and shape. It is used often to diagnose keratoconus and other corneal diseases, and corneal changes after keratotomy and keratoplasty. A significant application is in the fitting of contact lenses. In performing corneal topography, many different techniques can be employed: keratometry, keratoscopy, photokeratoscopy, profile photography, computer-assisted image processing, videokeratography, etc. [NIH]

Corneal Transplantation: Partial or total replacement of the cornea from one human or animal to another. [NIH]

Corneal Ulcer: Loss of epithelial tissue from the surface of the cornea due to progressive erosion and necrosis of the tissue; usually caused by bacterial, fungal, or viral infection. [NIH]

Coronary: Encircling in the manner of a crown; a term applied to vessels; nerves, ligaments, etc. The term usually denotes the arteries that supply the heart muscle and, by extension, a pathologic involvement of them. [EU]

Coronary Thrombosis: Presence of a thrombus in a coronary artery, often causing a

myocardial infarction. [NIH]

Corpus: The body of the uterus. [NIH]

Cortical: Pertaining to or of the nature of a cortex or bark. [EU]

Corticosteroid: Any of the steroids elaborated by the adrenal cortex (excluding the sex hormones of adrenal origin) in response to the release of corticotrophin (adrenocorticotropic hormone) by the pituitary gland, to any of the synthetic equivalents of these steroids, or to angiotensin II. They are divided, according to their predominant biological activity, into three major groups: glucocorticoids, chiefly influencing carbohydrate, fat, and protein metabolism; mineralocorticoids, affecting the regulation of electrolyte and water balance; and C19 androgens. Some corticosteroids exhibit both types of activity in varying degrees, and others exert only one type of effect. The corticosteroids are used clinically for hormonal replacement therapy, for suppression of ACTH secretion by the anterior pituitary, as antineoplastic, antiallergic, and anti-inflammatory agents, and to suppress the immune response. Called also adrenocortical hormone and corticoid. [EU]

Cortisol: A steroid hormone secreted by the adrenal cortex as part of the body's response to stress. [NIH]

Cranial: Pertaining to the cranium, or to the anterior (in animals) or superior (in humans) end of the body. [EU]

Cryotherapy: Any method that uses cold temperature to treat disease. [NIH]

Cutaneous: Having to do with the skin. [NIH]

Cyclic: Pertaining to or occurring in a cycle or cycles; the term is applied to chemical compounds that contain a ring of atoms in the nucleus. [EU]

Cytotoxic: Cell-killing. [NIH]

Day Care: Institutional health care of patients during the day. The patients return home at night. [NIH]

Deamination: The removal of an amino group (NH2) from a chemical compound. [NIH]

Decontamination: The removal of contaminating material, such as radioactive materials, biological materials, or chemical warfare agents, from a person or object. [NIH]

Degenerative: Undergoing degeneration : tending to degenerate; having the character of or involving degeneration; causing or tending to cause degeneration. [EU]

Dehydration: The condition that results from excessive loss of body water. [NIH]

Denaturation: Rupture of the hydrogen bonds by heating a DNA solution and then cooling it rapidly causes the two complementary strands to separate. [NIH]

Density: The logarithm to the base 10 of the opacity of an exposed and processed film. [NIH]

Dental Caries: Localized destruction of the tooth surface initiated by decalcification of the enamel followed by enzymatic lysis of organic structures and leading to cavity formation. If left unchecked, the cavity may penetrate the enamel and dentin and reach the pulp. The three most prominent theories used to explain the etiology of the disase are that acids produced by bacteria lead to decalcification; that micro-organisms destroy the enamel protein; or that keratolytic micro-organisms produce chelates that lead to decalcification. [NIH]

Dentists: Individuals licensed to practice dentistry. [NIH]

Deprivation: Loss or absence of parts, organs, powers, or things that are needed. [EU]

Dermatitis: Any inflammation of the skin. [NIH]

DES: Diethylstilbestrol. A synthetic hormone that was prescribed from the early 1940s until

1971 to help women with complications of pregnancy. DES has been linked to an increased risk of clear cell carcinoma of the vagina in daughters of women who used DES. DES may also increase the risk of breast cancer in women who used DES. [NIH]

Desiccation: Removal of moisture from a substance (chemical, food, tissue, etc.). [NIH]

Deuterium: Deuterium. The stable isotope of hydrogen. It has one neutron and one proton in the nucleus. [NIH]

Dexterity: Ability to move the hands easily and skillfully. [NIH]

Diabetes Mellitus: A heterogeneous group of disorders that share glucose intolerance in common. [NIH]

Diabetic Retinopathy: Retinopathy associated with diabetes mellitus, which may be of the background type, progressively characterized by microaneurysms, interretinal punctuate macular edema, or of the proliferative type, characterized by neovascularization of the retina and optic disk, which may project into the vitreous, proliferation of fibrous tissue, vitreous hemorrhage, and retinal detachment. [NIH]

Diagnostic procedure: A method used to identify a disease. [NIH]

Diamines: Organic chemicals which have two amino groups in an aliphatic chain. [NIH]

Digestive system: The organs that take in food and turn it into products that the body can use to stay healthy. Waste products the body cannot use leave the body through bowel movements. The digestive system includes the salivary glands, mouth, esophagus, stomach, liver, pancreas, gallbladder, small and large intestines, and rectum. [NIH]

Dihydroxy: AMPA/Kainate antagonist. [NIH]

Dilation: A process by which the pupil is temporarily enlarged with special eye drops (mydriatic); allows the eye care specialist to better view the inside of the eye. [NIH]

Dimethyl: A volatile metabolite of the amino acid methionine. [NIH]

Diopter: The measurement of refractive error. A negative diopter value signifies an eye with myopia and positive diopter value signifies an eye with hyperopia. [NIH]

Direct: 1. Straight; in a straight line. 2. Performed immediately and without the intervention of subsidiary means. [EU]

Discrete: Made up of separate parts or characterized by lesions which do not become blended; not running together; separate. [NIH]

Discrimination: The act of qualitative and/or quantitative differentiation between two or more stimuli. [NIH]

Disease Progression: The worsening of a disease over time. This concept is most often used for chronic and incurable diseases where the stage of the disease is an important determinant of therapy and prognosis. [NIH]

Disease Vectors: Invertebrates or non-human vertebrates which transmit infective organisms from one host to another. [NIH]

Disinfectant: An agent that disinfects; applied particularly to agents used on inanimate objects. [EU]

Disinfection: Rendering pathogens harmless through the use of heat, antiseptics, antibacterial agents, etc. [NIH]

Dislocation: The displacement of any part, more especially of a bone. Called also luxation. [EU]

Disparity: Failure of the two retinal images of an object to fall on corresponding retinal points. [NIH]

Dispenser: Glass, metal or plastic shell fitted with valve from which a pressurized formulation is dispensed; an instrument for atomizing. [NIH]

Dissociation: 1. The act of separating or state of being separated. 2. The separation of a molecule into two or more fragments (atoms, molecules, ions, or free radicals) produced by the absorption of light or thermal energy or by solvation. 3. In psychology, a defense mechanism in which a group of mental processes are segregated from the rest of a person's mental activity in order to avoid emotional distress, as in the dissociative disorders (q.v.), or in which an idea or object is segregated from its emotional significance; in the first sense it is roughly equivalent to splitting, in the second, to isolation. 4. A defect of mental integration in which one or more groups of mental processes become separated off from normal consciousness and, thus separated, function as a unitary whole. [EU]

Distal: Remote; farther from any point of reference; opposed to proximal. In dentistry, used to designate a position on the dental arch farther from the median line of the jaw. [EU]

Diurnal: Occurring during the day. [EU]

Dorsal: 1. Pertaining to the back or to any dorsum. 2. Denoting a position more toward the back surface than some other object of reference; same as posterior in human anatomy; superior in the anatomy of quadrupeds. [EU]

Drip: The continuous slow introduction of a fluid containing nutrients or drugs. [NIH]

Drive: A state of internal activity of an organism that is a necessary condition before a given stimulus will elicit a class of responses; e.g., a certain level of hunger (drive) must be present before food will elicit an eating response. [NIH]

Drug Delivery Systems: Systems of administering drugs through controlled delivery so that an optimum amount reaches the target site. Drug delivery systems encompass the carrier, route, and target. [NIH]

Duct: A tube through which body fluids pass. [NIH]

Dyes: Chemical substances that are used to stain and color other materials. The coloring may or may not be permanent. Dyes can also be used as therapeutic agents and test reagents in medicine and scientific research. [NIH]

Dystrophy: Any disorder arising from defective or faulty nutrition, especially the muscular dystrophies. [EU]

Edema: Excessive amount of watery fluid accumulated in the intercellular spaces, most commonly present in subcutaneous tissue. [NIH]

Effector: It is often an enzyme that converts an inactive precursor molecule into an active second messenger. [NIH]

Efficacy: The extent to which a specific intervention, procedure, regimen, or service produces a beneficial result under ideal conditions. Ideally, the determination of efficacy is based on the results of a randomized control trial. [NIH]

Elastic: Susceptible of resisting and recovering from stretching, compression or distortion applied by a force. [EU]

Elasticity: Resistance and recovery from distortion of shape. [NIH]

Elastin: The protein that gives flexibility to tissues. [NIH]

Elastomers: A generic term for all substances having the properties of natural, reclaimed, vulcanized, or synthetic rubber, in that they stretch under tension, have a high tensile strength, retract rapidly, and recover their original dimensions fully. [NIH]

Electrocardiogram: Measurement of electrical activity during heartbeats. [NIH]

Electrode: Component of the pacing system which is at the distal end of the lead. It is the

interface with living cardiac tissue across which the stimulus is transmitted. [NIH]

Electrolysis: Destruction by passage of a galvanic electric current, as in disintegration of a chemical compound in solution. [NIH]

Electrolyte: A substance that dissociates into ions when fused or in solution, and thus becomes capable of conducting electricity; an ionic solute. [EU]

Electron Spin Resonance Spectroscopy: A technique applicable to the wide variety of substances which exhibit paramagnetism because of the magnetic moments of unpaired electrons. The spectra are useful for detection and identification, for determination of electron structure, for study of interactions between molecules, and for measurement of nuclear spins and moments. (From McGraw-Hill Encyclopedia of Science and Technology, 7th edition) Electron nuclear double resonance (ENDOR) spectroscopy is a variant of the technique which can give enhanced resolution. Electron spin resonance analysis can now be used in vivo, including imaging applications such as magnetic resonance imaging. [NIH]

Electronystagmography: Recording of nystagmus based on changes in the electrical field surrounding the eye produced by the difference in potential between the cornea and the retina. [NIH]

Electrophoresis: An electrochemical process in which macromolecules or colloidal particles with a net electric charge migrate in a solution under the influence of an electric current. [NIH]

Electroretinography: Recording of electric potentials in the retina after stimulation by light. [NIH]

Embryo: The prenatal stage of mammalian development characterized by rapid morphological changes and the differentiation of basic structures. [NIH]

Emergency Medical Technicians: Paramedical personnel trained to provide basic emergency care and life support under the supervision of physicians and/or nurses. These services may be carried out at the site of the emergency, in the ambulance, or in a health care institution. [NIH]

Emollient: Softening or soothing; called also malactic. [EU]

Emulsion: A preparation of one liquid distributed in small globules throughout the body of a second liquid. The dispersed liquid is the discontinuous phase, and the dispersion medium is the continuous phase. When oil is the dispersed liquid and an aqueous solution is the continuous phase, it is known as an oil-in-water emulsion, whereas when water or aqueous solution is the dispersed phase and oil or oleaginous substance is the continuous phase, it is known as a water-in-oil emulsion. Pharmaceutical emulsions for which official standards have been promulgated include cod liver oil emulsion, cod liver oil emulsion with malt, liquid petrolatum emulsion, and phenolphthalein in liquid petrolatum emulsion. [EU]

Endogenous: Produced inside an organism or cell. The opposite is external (exogenous) production. [NIH]

Endophthalmitis: Suppurative inflammation of the tissues of the internal structures of the eye; not all layers of the uvea are affected. Fungi, necrosis of intraocular tumors, and retained intraocular foreign bodies often cause a purulent endophthalmitis. [NIH]

Endothelial cell: The main type of cell found in the inside lining of blood vessels, lymph vessels, and the heart. [NIH]

Endothelium: A layer of epithelium that lines the heart, blood vessels (endothelium, vascular), lymph vessels (endothelium, lymphatic), and the serous cavities of the body. [NIH]

Endothelium, Lymphatic: Unbroken cellular lining (intima) of the lymph vessels (e.g., the high endothelial lymphatic venules). It is more permeable than vascular endothelium,

lacking selective absorption and functioning mainly to remove plasma proteins that have filtered through the capillaries into the tissue spaces. [NIH]

Endothelium, Vascular: Single pavement layer of cells which line the luminal surface of the entire vascular system and regulate the transport of macromolecules and blood components from interstitium to lumen; this function has been most intensively studied in the blood capillaries. [NIH]

Endotoxic: Of, relating to, or acting as an endotoxin (= a heat-stable toxin, associated with the outer membranes of certain gram-negative bacteria. Endotoxins are not secreted and are released only when the cells are disrupted). [EU]

Endotoxins: Toxins closely associated with the living cytoplasm or cell wall of certain microorganisms, which do not readily diffuse into the culture medium, but are released upon lysis of the cells. [NIH]

Enhancer: Transcriptional element in the virus genome. [NIH]

Environmental Health: The science of controlling or modifying those conditions, influences, or forces surrounding man which relate to promoting, establishing, and maintaining health. [NIH]

Enzymatic: Phase where enzyme cuts the precursor protein. [NIH]

Enzyme: A protein that speeds up chemical reactions in the body. [NIH]

Epidermis: Nonvascular layer of the skin. It is made up, from within outward, of five layers: 1) basal layer (stratum basale epidermidis); 2) spinous layer (stratum spinosum epidermidis); 3) granular layer (stratum granulosum epidermidis); 4) clear layer (stratum lucidum epidermidis); and 5) horny layer (stratum corneum epidermidis). [NIH]

Epithelial: Refers to the cells that line the internal and external surfaces of the body. [NIH]

Epithelial Cells: Cells that line the inner and outer surfaces of the body. [NIH]

Epithelium: One or more layers of epithelial cells, supported by the basal lamina, which covers the inner or outer surfaces of the body. [NIH]

Erythema: Redness of the skin produced by congestion of the capillaries. This condition may result from a variety of causes. [NIH]

Erythrocytes: Red blood cells. Mature erythrocytes are non-nucleated, biconcave disks containing hemoglobin whose function is to transport oxygen. [NIH]

Esophagus: The muscular tube through which food passes from the throat to the stomach. [NIH]

Esotropia: A form of ocular misalignment characterized by an excessive convergence of the visual axes, resulting in a "cross-eye" appearance. An example of this condition occurs when paralysis of the lateral rectus muscle causes an abnormal inward deviation of one eye on attempted gaze. [NIH]

Esterification: The process of converting an acid into an alkyl or aryl derivative. Most frequently the process consists of the reaction of an acid with an alcohol in the presence of a trace of mineral acid as catalyst or the reaction of an acyl chloride with an alcohol. Esterification can also be accomplished by enzymatic processes. [NIH]

Ether: One of a class of organic compounds in which any two organic radicals are attached directly to a single oxygen atom. [NIH]

Ethylene Glycol: A colorless, odorless, viscous dihydroxy alcohol. It has a sweet taste, but is poisonous if ingested. Ethylene glycol is the most important glycol commercially available and is manufactured on a large scale in the United States. It is used as an antifreeze and coolant, in hydraulic fluids, and in the manufacture of low-freezing dynamites and resins.

[NIH]

Excimer laser: An ultraviolet laser used in refractive surgery to remove corneal tissue. [NIH]

Excipients: Usually inert substances added to a prescription in order to provide suitable consistency to the dosage form; a binder, matrix, base or diluent in pills, tablets, creams, salves, etc. [NIH]

Exhaustion: The feeling of weariness of mind and body. [NIH]

Exogenous: Developed or originating outside the organism, as exogenous disease. [EU]

Exotropia: A form of ocular misalignment where the visual axes diverge inappropriately. For example, medial rectus muscle weakness may produce this condition as the affected eye will deviate laterally upon attempted forward gaze. An exotropia occurs due to the relatively unopposed force exerted on the eye by the lateral rectus muscle, which pulls the eye in an outward direction. [NIH]

Expiration: The act of breathing out, or expelling air from the lungs. [EU]

Extracellular: Outside a cell or cells. [EU]

Extracellular Matrix: A meshwork-like substance found within the extracellular space and in association with the basement membrane of the cell surface. It promotes cellular proliferation and provides a supporting structure to which cells or cell lysates in culture dishes adhere. [NIH]

Extraction: The process or act of pulling or drawing out. [EU]

Eye Infections: Infection, moderate to severe, caused by bacteria, fungi, or viruses, which occurs either on the external surface of the eye or intraocularly with probable inflammation, visual impairment, or blindness. [NIH]

Eye Injuries: Damage or trauma inflicted to the eye by external means. The concept includes both surface injuries and intraocular injuries. [NIH]

Eye Movements: Voluntary or reflex-controlled movements of the eye. [NIH]

Facial: Of or pertaining to the face. [EU]

Factor V: Heat- and storage-labile plasma glycoprotein which accelerates the conversion of prothrombin to thrombin in blood coagulation. Factor V accomplishes this by forming a complex with factor Xa, phospholipid, and calcium (prothrombinase complex). Deficiency of factor V leads to Owren's disease. [NIH]

Factor Va: Activated form of factor V. It is an essential cofactor for the activation of prothrombin catalyzed by factor Xa. [NIH]

Family Planning: Programs or services designed to assist the family in controlling reproduction by either improving or diminishing fertility. [NIH]

Farsightedness: The common term for hyperopia. [NIH]

Fat: Total lipids including phospholipids. [NIH]

Fatigue: The state of weariness following a period of exertion, mental or physical, characterized by a decreased capacity for work and reduced efficiency to respond to stimuli. [NIH]

Fatty acids: A major component of fats that are used by the body for energy and tissue development. [NIH]

Feeding Methods: Methods of giving food to humans or animals. [NIH]

Fixation: 1. The act or operation of holding, suturing, or fastening in a fixed position. 2. The condition of being held in a fixed position. 3. In psychiatry, a term with two related but distinct meanings : (1) arrest of development at a particular stage, which like regression

(return to an earlier stage), if temporary is a normal reaction to setbacks and difficulties but if protracted or frequent is a cause of developmental failures and emotional problems, and (2) a close and suffocating attachment to another person, especially a childhood figure, such as one's mother or father. Both meanings are derived from psychoanalytic theory and refer to 'fixation' of libidinal energy either in a specific erogenous zone, hence fixation at the oral, anal, or phallic stage, or in a specific object, hence mother or father fixation. 4. The use of a fixative (q.v.) to preserve histological or cytological specimens. 5. In chemistry, the process whereby a substance is removed from the gaseous or solution phase and localized, as in carbon dioxide fixation or nitrogen fixation. 6. In ophthalmology, direction of the gaze so that the visual image of the object falls on the fovea centralis. 7. In film processing, the chemical removal of all undeveloped salts of the film emulsion, leaving only the developed silver to form a permanent image. [EU]

Flatus: Gas passed through the rectum. [NIH]

Fluorescein Angiography: Visualization of a vascular system after intravenous injection of a fluorescein solution. The images may be photographed or televised. It is used especially in studying the retinal and uveal vasculature. [NIH]

Fluorine: A nonmetallic, diatomic gas that is a trace element and member of the halogen family. It is used in dentistry as flouride to prevent dental caries. [NIH]

Flush: Transient, episodic redness of the face and neck caused by certain diseases, ingestion of certain drugs or other substances, heat, emotional factors, or physical exertion. [EU]

Flushing: A transient reddening of the face that may be due to fever, certain drugs, exertion, stress, or a disease process. [NIH]

Fold: A plication or doubling of various parts of the body. [NIH]

Forearm: The part between the elbow and the wrist. [NIH]

Fovea: The central part of the macula that provides the sharpest vision. [NIH]

Free Radical Scavengers: Substances that influence the course of a chemical reaction by ready combination with free radicals. Among other effects, this combining activity protects pancreatic islets against damage by cytokines and prevents myocardial and pulmonary perfusion injuries. [NIH]

Friction: Surface resistance to the relative motion of one body against the rubbing, sliding, rolling, or flowing of another with which it is in contact. [NIH]

Fundus: The larger part of a hollow organ that is farthest away from the organ's opening. The bladder, gallbladder, stomach, uterus, eye, and cavity of the middle ear all have a fundus. [NIH]

Fungi: A kingdom of eukaryotic, heterotrophic organisms that live as saprobes or parasites, including mushrooms, yeasts, smuts, molds, etc. They reproduce either sexually or asexually, and have life cycles that range from simple to complex. Filamentous fungi refer to those that grow as multicelluar colonies (mushrooms and molds). [NIH]

Fungistatic: Inhibiting the growth of fungi. [EU]

Gallbladder: The pear-shaped organ that sits below the liver. Bile is concentrated and stored in the gallbladder. [NIH]

Gas: Air that comes from normal breakdown of food. The gases are passed out of the body through the rectum (flatus) or the mouth (burp). [NIH]

Gastric: Having to do with the stomach. [NIH]

Gastrointestinal: Refers to the stomach and intestines. [NIH]

Gels: Colloids with a solid continuous phase and liquid as the dispersed phase; gels may be

unstable when, due to temperature or other cause, the solid phase liquifies; the resulting colloid is called a sol. [NIH]

Gene: The functional and physical unit of heredity passed from parent to offspring. Genes are pieces of DNA, and most genes contain the information for making a specific protein. [NIH]

General practitioner: A medical practitioner who does not specialize in a particular branch of medicine or limit his practice to a specific class of diseases. [NIH]

Genital: Pertaining to the genitalia. [EU]

Gland: An organ that produces and releases one or more substances for use in the body. Some glands produce fluids that affect tissues or organs. Others produce hormones or participate in blood production. [NIH]

Glare: Scatter from bright light that decreases vision. [NIH]

Glucocorticoid: A compound that belongs to the family of compounds called corticosteroids (steroids). Glucocorticoids affect metabolism and have anti-inflammatory and immunosuppressive effects. They may be naturally produced (hormones) or synthetic (drugs). [NIH]

Glucose: D-Glucose. A primary source of energy for living organisms. It is naturally occurring and is found in fruits and other parts of plants in its free state. It is used therapeutically in fluid and nutrient replacement. [NIH]

Glucose Intolerance: A pathological state in which the fasting plasma glucose level is less than 140 mg per deciliter and the 30-, 60-, or 90-minute plasma glucose concentration following a glucose tolerance test exceeds 200 mg per deciliter. This condition is seen frequently in diabetes mellitus but also occurs with other diseases. [NIH]

Glucuronic Acid: Derivatives of uronic acid found throughout the plant and animal kingdoms. They detoxify drugs and toxins by conjugating with them to form glucuronides in the liver which are more water-soluble metabolites that can be easily eliminated from the body. [NIH]

Glycerol: A trihydroxy sugar alcohol that is an intermediate in carbohydrate and lipid metabolism. It is used as a solvent, emollient, pharmaceutical agent, and sweetening agent. [NIH]

Glycerophospholipids: Derivatives of phosphatidic acid in which the hydrophobic regions are composed of two fatty acids and a polar alcohol is joined to the C-3 position of glycerol through a phosphodiester bond. They are named according to their polar head groups, such as phosphatidylcholine and phosphatidylethanolamine. [NIH]

Glycine: A non-essential amino acid. It is found primarily in gelatin and silk fibroin and used therapeutically as a nutrient. It is also a fast inhibitory neurotransmitter. [NIH]

Glycoprotein: A protein that has sugar molecules attached to it. [NIH]

Gonadal: Pertaining to a gonad. [EU]

Governing Board: The group in which legal authority is vested for the control of health-related institutions and organizations. [NIH]

Graft: Healthy skin, bone, or other tissue taken from one part of the body and used to replace diseased or injured tissue removed from another part of the body. [NIH]

Grafting: The operation of transfer of tissue from one site to another. [NIH]

Granule: A small pill made from sucrose. [EU]

Grasses: A large family, Gramineae, of narrow-leaved herbaceous monocots. Many grasses produce highly allergenic pollens and are hosts to cattle parasites and toxic fungi. [NIH]

Growth: The progressive development of a living being or part of an organism from its earliest stage to maturity. [NIH]

Habitual: Of the nature of a habit; according to habit; established by or repeated by force of habit, customary. [EU]

Handwashing: The act of cleansing the hands with water or other liquid, with or without the inclusion of soap or other detergent, for the purpose of removing soil or microorganisms. [NIH]

Haptens: Small antigenic determinants capable of eliciting an immune response only when coupled to a carrier. Haptens bind to antibodies but by themselves cannot elicit an antibody response. [NIH]

Hearing aid: A miniature, portable sound amplifier for persons with impaired hearing, consisting of a microphone, audio amplifier, earphone, and battery. [NIH]

Hemoglobin: One of the fractions of glycosylated hemoglobin A1c. Glycosylated hemoglobin is formed when linkages of glucose and related monosaccharides bind to hemoglobin A and its concentration represents the average blood glucose level over the previous several weeks. HbA1c levels are used as a measure of long-term control of plasma glucose (normal, 4 to 6 percent). In controlled diabetes mellitus, the concentration of glycosylated hemoglobin A is within the normal range, but in uncontrolled cases the level may be 3 to 4 times the normal conentration. Generally, complications are substantially lower among patients with Hb levels of 7 percent or less than in patients with HbA1c levels of 9 percent or more. [NIH]

Hemoglobin A: Normal adult human hemoglobin. The globin moiety consists of two alpha and two beta chains. [NIH]

Hemorrhage: Bleeding or escape of blood from a vessel. [NIH]

Heparin: Heparinic acid. A highly acidic mucopolysaccharide formed of equal parts of sulfated D-glucosamine and D-glucuronic acid with sulfaminic bridges. The molecular weight ranges from six to twenty thousand. Heparin occurs in and is obtained from liver, lung, mast cells, etc., of vertebrates. Its function is unknown, but it is used to prevent blood clotting in vivo and vitro, in the form of many different salts. [NIH]

Hepatic: Refers to the liver. [NIH]

Herbicides: Pesticides used to destroy unwanted vegetation, especially various types of weeds, grasses, and woody plants. [NIH]

Hereditary: Of, relating to, or denoting factors that can be transmitted genetically from one generation to another. [NIH]

Heredity: 1. The genetic transmission of a particular quality or trait from parent to offspring. 2. The genetic constitution of an individual. [EU]

Herpes: Any inflammatory skin disease caused by a herpesvirus and characterized by the formation of clusters of small vesicles. When used alone, the term may refer to herpes simplex or to herpes zoster. [EU]

Herpes Zoster: Acute vesicular inflammation. [NIH]

Heterogeneity: The property of one or more samples or populations which implies that they are not identical in respect of some or all of their parameters, e. g. heterogeneity of variance. [NIH]

Heterotrophic: Pertaining to organisms that are consumers and dependent on other organisms for their source of energy (food). [NIH]

Heterotropia: One in which the angle of squint remains relatively unaltered on conjugate

movement of the eyes. [NIH]

Homologous: Corresponding in structure, position, origin, etc., as (a) the feathers of a bird and the scales of a fish, (b) antigen and its specific antibody, (c) allelic chromosomes. [EU]

Hormone: A substance in the body that regulates certain organs. Hormones such as gastrin help in breaking down food. Some hormones come from cells in the stomach and small intestine. [NIH]

Host: Any animal that receives a transplanted graft. [NIH]

Humour: 1. A normal functioning fluid or semifluid of the body (as the blood, lymph or bile) especially of vertebrates. 2. A secretion that is itself an excitant of activity (as certain hormones). [EU]

Hydration: Combining with water. [NIH]

Hydrogel: A network of cross-linked hydrophilic macromolecules used in biomedical applications. [NIH]

Hydrogen: The first chemical element in the periodic table. It has the atomic symbol H, atomic number 1, and atomic weight 1. It exists, under normal conditions, as a colorless, odorless, tasteless, diatomic gas. Hydrogen ions are protons. Besides the common H1 isotope, hydrogen exists as the stable isotope deuterium and the unstable, radioactive isotope tritium. [NIH]

Hydrogen Peroxide: A strong oxidizing agent used in aqueous solution as a ripening agent, bleach, and topical anti-infective. It is relatively unstable and solutions deteriorate over time unless stabilized by the addition of acetanilide or similar organic materials. [NIH]

Hydrolysis: The process of cleaving a chemical compound by the addition of a molecule of water. [NIH]

Hydrophilic: Readily absorbing moisture; hygroscopic; having strongly polar groups that readily interact with water. [EU]

Hydrophobic: Not readily absorbing water, or being adversely affected by water, as a hydrophobic colloid. [EU]

Hydroxylysine: A hydroxylated derivative of the amino acid lysine that is present in certain collagens. [NIH]

Hydroxyproline: A hydroxylated form of the imino acid proline. A deficiency in ascorbic acid can result in impaired hydroxyproline formation. [NIH]

Hypermetropia: Visual disorder caused by an insufficient refractive power of the eye; only objects far from the eyes appear to be in focus. [NIH]

Hyperopia: Farsightedness; ability to see distant objects more clearly than close objects; may be corrected with glasses or contact lenses. [NIH]

Hypersensitivity: Altered reactivity to an antigen, which can result in pathologic reactions upon subsequent exposure to that particular antigen. [NIH]

Hypertrophy: General increase in bulk of a part or organ, not due to tumor formation, nor to an increase in the number of cells. [NIH]

Hypoxia: Reduction of oxygen supply to tissue below physiological levels despite adequate perfusion of the tissue by blood. [EU]

Id: The part of the personality structure which harbors the unconscious instinctive desires and strivings of the individual. [NIH]

Immersion: The placing of a body or a part thereof into a liquid. [NIH]

Immune response: The activity of the immune system against foreign substances

(antigens). [NIH]

Immune system: The organs, cells, and molecules responsible for the recognition and disposal of foreign ("non-self") material which enters the body. [NIH]

Immunity: Nonsusceptibility to the invasive or pathogenic effects of foreign microorganisms or to the toxic effect of antigenic substances. [NIH]

Immunization: Deliberate stimulation of the host's immune response. Active immunization involves administration of antigens or immunologic adjuvants. Passive immunization involves administration of immune sera or lymphocytes or their extracts (e.g., transfer factor, immune RNA) or transplantation of immunocompetent cell producing tissue (thymus or bone marrow). [NIH]

Immunodeficiency: The decreased ability of the body to fight infection and disease. [NIH]

Immunodeficiency syndrome: The inability of the body to produce an immune response. [NIH]

Immunogenic: Producing immunity; evoking an immune response. [EU]

Immunoglobulin: A protein that acts as an antibody. [NIH]

Immunology: The study of the body's immune system. [NIH]

Impairment: In the context of health experience, an impairment is any loss or abnormality of psychological, physiological, or anatomical structure or function. [NIH]

Implantation: The insertion or grafting into the body of biological, living, inert, or radioactive material. [EU]

In situ: In the natural or normal place; confined to the site of origin without invasion of neighbouring tissues. [EU]

In vitro: In the laboratory (outside the body). The opposite of in vivo (in the body). [NIH]

In vivo: In the body. The opposite of in vitro (outside the body or in the laboratory). [NIH]

Incision: A cut made in the body during surgery. [NIH]

Indicative: That indicates; that points out more or less exactly; that reveals fairly clearly. [EU]

Indolent: A type of cancer that grows slowly. [NIH]

Induction: The act or process of inducing or causing to occur, especially the production of a specific morphogenetic effect in the developing embryo through the influence of evocators or organizers, or the production of anaesthesia or unconsciousness by use of appropriate agents. [EU]

Infancy: The period of complete dependency prior to the acquisition of competence in walking, talking, and self-feeding. [NIH]

Infarction: A pathological process consisting of a sudden insufficient blood supply to an area, which results in necrosis of that area. It is usually caused by a thrombus, an embolus, or a vascular torsion. [NIH]

Infection: 1. Invasion and multiplication of microorganisms in body tissues, which may be clinically unapparent or result in local cellular injury due to competitive metabolism, toxins, intracellular replication, or antigen-antibody response. The infection may remain localized, subclinical, and temporary if the body's defensive mechanisms are effective. A local infection may persist and spread by extension to become an acute, subacute, or chronic clinical infection or disease state. A local infection may also become systemic when the microorganisms gain access to the lymphatic or vascular system. 2. An infectious disease. [EU]

Inflammation: A pathological process characterized by injury or destruction of tissues caused by a variety of cytologic and chemical reactions. It is usually manifested by typical signs of pain, heat, redness, swelling, and loss of function. [NIH]

Ingestion: Taking into the body by mouth [NIH]

Initiation: Mutation induced by a chemical reactive substance causing cell changes; being a step in a carcinogenic process. [NIH]

Initiator: A chemically reactive substance which may cause cell changes if ingested, inhaled or absorbed into the body; the substance may thus initiate a carcinogenic process. [NIH]

Innervation: 1. The distribution or supply of nerves to a part. 2. The supply of nervous energy or of nerve stimulus sent to a part. [EU]

Inorganic: Pertaining to substances not of organic origin. [EU]

Insecticides: Pesticides designed to control insects that are harmful to man. The insects may be directly harmful, as those acting as disease vectors, or indirectly harmful, as destroyers of crops, food products, or textile fabrics. [NIH]

Insulin: A protein hormone secreted by beta cells of the pancreas. Insulin plays a major role in the regulation of glucose metabolism, generally promoting the cellular utilization of glucose. It is also an important regulator of protein and lipid metabolism. Insulin is used as a drug to control insulin-dependent diabetes mellitus. [NIH]

Insulin-dependent diabetes mellitus: A disease characterized by high levels of blood glucose resulting from defects in insulin secretion, insulin action, or both. Autoimmune, genetic, and environmental factors are involved in the development of type I diabetes. [NIH]

Interferon: A biological response modifier (a substance that can improve the body's natural response to disease). Interferons interfere with the division of cancer cells and can slow tumor growth. There are several types of interferons, including interferon-alpha, -beta, and -gamma. These substances are normally produced by the body. They are also made in the laboratory for use in treating cancer and other diseases. [NIH]

Interferon-alpha: One of the type I interferons produced by peripheral blood leukocytes or lymphoblastoid cells when exposed to live or inactivated virus, double-stranded RNA, or bacterial products. It is the major interferon produced by virus-induced leukocyte cultures and, in addition to its pronounced antiviral activity, it causes activation of NK cells. [NIH]

Intracellular: Inside a cell. [NIH]

Intraocular: Within the eye. [EU]

Intraocular pressure: Pressure of the fluid inside the eye; normal IOP varies among individuals. [NIH]

Intravenous: IV. Into a vein. [NIH]

Intrinsic: Situated entirely within or pertaining exclusively to a part. [EU]

Invasive: 1. Having the quality of invasiveness. 2. Involving puncture or incision of the skin or insertion of an instrument or foreign material into the body; said of diagnostic techniques. [EU]

Involuntary: Reaction occurring without intention or volition. [NIH]

Iodine: A nonmetallic element of the halogen group that is represented by the atomic symbol I, atomic number 53, and atomic weight of 126.90. It is a nutritionally essential element, especially important in thyroid hormone synthesis. In solution, it has anti-infective properties and is used topically. [NIH]

Ionization: 1. Any process by which a neutral atom gains or loses electrons, thus acquiring a net charge, as the dissociation of a substance in solution into ions or ion production by the

passage of radioactive particles. 2. Iontophoresis. [EU]

Ionizing: Radiation comprising charged particles, e. g. electrons, protons, alpha-particles, etc., having sufficient kinetic energy to produce ionization by collision. [NIH]

Ions: An atom or group of atoms that have a positive or negative electric charge due to a gain (negative charge) or loss (positive charge) of one or more electrons. Atoms with a positive charge are known as cations; those with a negative charge are anions. [NIH]

Iridocyclitis: Acute or chronic inflammation of the iris and ciliary body characterized by exudates into the anterior chamber, discoloration of the iris, and constricted, sluggish pupil. Symptoms include radiating pain, photophobia, lacrimation, and interference with vision. [NIH]

Iris: The most anterior portion of the uveal layer, separating the anterior chamber from the posterior. It consists of two layers - the stroma and the pigmented epithelium. Color of the iris depends on the amount of melanin in the stroma on reflection from the pigmented epithelium. [NIH]

Isotonic: A biological term denoting a solution in which body cells can be bathed without a net flow of water across the semipermeable cell membrane. Also, denoting a solution having the same tonicity as some other solution with which it is compared, such as physiologic salt solution and the blood serum. [EU]

Joint: The point of contact between elements of an animal skeleton with the parts that surround and support it. [NIH]

Kb: A measure of the length of DNA fragments, 1 Kb = 1000 base pairs. The largest DNA fragments are up to 50 kilobases long. [NIH]

Keratectomy: The surgical removal of corneal tissue. [NIH]

Keratin: A class of fibrous proteins or scleroproteins important both as structural proteins and as keys to the study of protein conformation. The family represents the principal constituent of epidermis, hair, nails, horny tissues, and the organic matrix of tooth enamel. Two major conformational groups have been characterized, alpha-keratin, whose peptide backbone forms an alpha-helix, and beta-keratin, whose backbone forms a zigzag or pleated sheet structure. [NIH]

Keratitis: Inflammation of the cornea. [NIH]

Keratoconjunctivitis: Simultaneous inflammation of the cornea and conjunctiva. [NIH]

Keratoconus: A disorder characterized by an irregular corneal surface (cone-shaped) resulting in blurred and distorted images. [NIH]

Keratomileusis: Carving of the cornea to reshape it. [NIH]

Keratotomy: A surgical incision (cut) of the cornea. [NIH]

Ketoacidosis: Acidosis accompanied by the accumulation of ketone bodies (ketosis) in the body tissues and fluids, as in diabetic acidosis. [EU]

Ketone Bodies: Chemicals that the body makes when there is not enough insulin in the blood and it must break down fat for its energy. Ketone bodies can poison and even kill body cells. When the body does not have the help of insulin, the ketones build up in the blood and then "spill" over into the urine so that the body can get rid of them. The body can also rid itself of one type of ketone, called acetone, through the lungs. This gives the breath a fruity odor. Ketones that build up in the body for a long time lead to serious illness and coma. [NIH]

Kinetic: Pertaining to or producing motion. [EU]

Labile: 1. Gliding; moving from point to point over the surface; unstable; fluctuating. 2.

Chemically unstable. [EU]

Laceration: 1. The act of tearing. 2. A torn, ragged, mangled wound. [EU]

Lacrimal: Pertaining to the tears. [EU]

Large Intestine: The part of the intestine that goes from the cecum to the rectum. The large intestine absorbs water from stool and changes it from a liquid to a solid form. The large intestine is 5 feet long and includes the appendix, cecum, colon, and rectum. Also called colon. [NIH]

Larva: Wormlike or grublike stage, following the egg in the life cycle of insects, worms, and other metamorphosing animals. [NIH]

Laser Surgery: The use of a laser either to vaporize surface lesions or to make bloodless cuts in tissue. It does not include the coagulation of tissue by laser. [NIH]

Laser therapy: The use of an intensely powerful beam of light to kill cancer cells. [NIH]

Laxative: An agent that acts to promote evacuation of the bowel; a cathartic or purgative. [EU]

Lens: The transparent, double convex (outward curve on both sides) structure suspended between the aqueous and vitreous; helps to focus light on the retina. [NIH]

Lenses, Intraocular: Artificial implanted lenses. [NIH]

Lenticular: 1. Pertaining to or shaped like a lens. 2. Pertaining to the crystalline lens. 3. Pertaining to the lenticular nucleus. [EU]

Lethal: Deadly, fatal. [EU]

Library Services: Services offered to the library user. They include reference and circulation. [NIH]

Lidocaine: A local anesthetic and cardiac depressant used as an antiarrhythmia agent. Its actions are more intense and its effects more prolonged than those of procaine but its duration of action is shorter than that of bupivacaine or prilocaine. [NIH]

Life cycle: The successive stages through which an organism passes from fertilized ovum or spore to the fertilized ovum or spore of the next generation. [NIH]

Linkage: The tendency of two or more genes in the same chromosome to remain together from one generation to the next more frequently than expected according to the law of independent assortment. [NIH]

Lipid: Fat. [NIH]

Lipid A: Lipid A is the biologically active component of lipopolysaccharides. It shows strong endotoxic activity and exhibits immunogenic properties. [NIH]

Lipofuscin: A naturally occurring lipid pigment with histochemical characteristics similar to ceroid. It accumulates in various normal tissues and apparently increases in quantity with age. [NIH]

Lipopolysaccharides: Substance consisting of polysaccaride and lipid. [NIH]

Liquor: 1. A liquid, especially an aqueous solution containing a medicinal substance. 2. A general term used in anatomical nomenclature for certain fluids of the body. [EU]

Liver: A large, glandular organ located in the upper abdomen. The liver cleanses the blood and aids in digestion by secreting bile. [NIH]

Localized: Cancer which has not metastasized yet. [NIH]

Longitudinal study: Also referred to as a "cohort study" or "prospective study"; the analytic method of epidemiologic study in which subsets of a defined population can be identified

who are, have been, or in the future may be exposed or not exposed, or exposed in different degrees, to a factor or factors hypothesized to influence the probability of occurrence of a given disease or other outcome. The main feature of this type of study is to observe large numbers of subjects over an extended time, with comparisons of incidence rates in groups that differ in exposure levels. [NIH]

Lubricants: Oily or slippery substances. [NIH]

Lubrication: The application of a substance to diminish friction between two surfaces. It may refer to oils, greases, and similar substances for the lubrication of medical equipment but it can be used for the application of substances to tissue to reduce friction, such as lotions for skin and vaginal lubricants. [NIH]

Lumen: The cavity or channel within a tube or tubular organ. [EU]

Lymph: The almost colorless fluid that travels through the lymphatic system and carries cells that help fight infection and disease. [NIH]

Lymphatic: The tissues and organs, including the bone marrow, spleen, thymus, and lymph nodes, that produce and store cells that fight infection and disease. [NIH]

Lymphoid: Referring to lymphocytes, a type of white blood cell. Also refers to tissue in which lymphocytes develop. [NIH]

Lytic: 1. Pertaining to lysis or to a lysin. 2. Producing lysis. [EU]

Macula: A stain, spot, or thickening. Often used alone to refer to the macula retinae. [EU]

Macula Lutea: An oval area in the retina, 3 to 5 mm in diameter, usually located temporal to the superior pole of the eye and slightly below the level of the optic disk. [NIH]

Macular Degeneration: Degenerative changes in the macula lutea of the retina. [NIH]

Magnetic Resonance Imaging: Non-invasive method of demonstrating internal anatomy based on the principle that atomic nuclei in a strong magnetic field absorb pulses of radiofrequency energy and emit them as radiowaves which can be reconstructed into computerized images. The concept includes proton spin tomographic techniques. [NIH]

Malnutrition: A condition caused by not eating enough food or not eating a balanced diet. [NIH]

Manifest: Being the part or aspect of a phenomenon that is directly observable : concretely expressed in behaviour. [EU]

Meat: The edible portions of any animal used for food including domestic mammals (the major ones being cattle, swine, and sheep) along with poultry, fish, shellfish, and game. [NIH]

Medial: Lying near the midsaggital plane of the body; opposed to lateral. [NIH]

Medical Records: Recording of pertinent information concerning patient's illness or illnesses. [NIH]

MEDLINE: An online database of MEDLARS, the computerized bibliographic Medical Literature Analysis and Retrieval System of the National Library of Medicine. [NIH]

Meibomian: A series of simple, branched, alveolar, sebaceous glands, located in the tarso of the eyelids, whose ducts empty into the eyelid margins in line with and lateral to the lacrimal puncta. [NIH]

Melanin: The substance that gives the skin its color. [NIH]

Melanoma: A form of skin cancer that arises in melanocytes, the cells that produce pigment. Melanoma usually begins in a mole. [NIH]

Membrane: A very thin layer of tissue that covers a surface. [NIH]

Membrane Lipids: Lipids, predominantly phospholipids, cholesterol and small amounts of glycolipids found in membranes including cellular and intracellular membranes. These lipids may be arranged in bilayers in the membranes with integral proteins between the layers and peripheral proteins attached to the outside. Membrane lipids are required for active transport, several enzymatic activities and membrane formation. [NIH]

Memory: Complex mental function having four distinct phases: (1) memorizing or learning, (2) retention, (3) recall, and (4) recognition. Clinically, it is usually subdivided into immediate, recent, and remote memory. [NIH]

Meniscus: A fibro-cartilage within a joint, especially of the knee. [NIH]

Mental: Pertaining to the mind; psychic. 2. (L. mentum chin) pertaining to the chin. [EU]

Mental Disorders: Psychiatric illness or diseases manifested by breakdowns in the adaptational process expressed primarily as abnormalities of thought, feeling, and behavior producing either distress or impairment of function. [NIH]

Mental Health: The state wherein the person is well adjusted. [NIH]

Mercury: A silver metallic element that exists as a liquid at room temperature. It has the atomic symbol Hg (from hydrargyrum, liquid silver), atomic number 80, and atomic weight 200.59. Mercury is used in many industrial applications and its salts have been employed therapeutically as purgatives, antisyphilitics, disinfectants, and astringents. It can be absorbed through the skin and mucous membranes which leads to mercury poisoning. Because of its toxicity, the clinical use of mercury and mercurials is diminishing. [NIH]

Metabolite: Any substance produced by metabolism or by a metabolic process. [EU]

Metamorphosis: The ontogeny of insects, i. e. the series of changes undergone from egg, through larva and pupa, or through nymph, to adult. [NIH]

Methacrylates: Acrylic acids or acrylates which are substituted in the C-2 position with a methyl group. [NIH]

Methionine: A sulfur containing essential amino acid that is important in many body functions. It is a chelating agent for heavy metals. [NIH]

Methylcellulose: Methylester of cellulose. Methylcellulose is used as an emulsifying and suspending agent in cosmetics, pharmaceutics and the chemical industry. It is used therapeutically as a bulk laxative. [NIH]

MI: Myocardial infarction. Gross necrosis of the myocardium as a result of interruption of the blood supply to the area; it is almost always caused by atherosclerosis of the coronary arteries, upon which coronary thrombosis is usually superimposed. [NIH]

Microbe: An organism which cannot be observed with the naked eye; e. g. unicellular animals, lower algae, lower fungi, bacteria. [NIH]

Microbiological: Pertaining to microbiology : the science that deals with microorganisms, including algae, bacteria, fungi, protozoa and viruses. [EU]

Microbiology: The study of microorganisms such as fungi, bacteria, algae, archaea, and viruses. [NIH]

Micro-organism: An organism which cannot be observed with the naked eye; e. g. unicellular animals, lower algae, lower fungi, bacteria. [NIH]

Microscopy: The application of microscope magnification to the study of materials that cannot be properly seen by the unaided eye. [NIH]

Microspheres: Small uniformly-sized spherical particles frequently labeled with radioisotopes or various reagents acting as tags or markers. [NIH]

Modification: A change in an organism, or in a process in an organism, that is acquired

from its own activity or environment. [NIH]

Molecular: Of, pertaining to, or composed of molecules : a very small mass of matter. [EU]

Molecule: A chemical made up of two or more atoms. The atoms in a molecule can be the same (an oxygen molecule has two oxygen atoms) or different (a water molecule has two hydrogen atoms and one oxygen atom). Biological molecules, such as proteins and DNA, can be made up of many thousands of atoms. [NIH]

Monocular: Diplopia identified with one eye only; it may be induced with a double prism, or it may occur either as a result of double imagery due to an optical defect in the eye, or as a result of simultaneous use of normal and anomalous retinal correspondence. [NIH]

Monovision: The purposeful adjustment of one eye for near vision and the other eye fordistance vision. [NIH]

Morphological: Relating to the configuration or the structure of live organs. [NIH]

Morphology: The science of the form and structure of organisms (plants, animals, and other forms of life). [NIH]

Mucolytic: Destroying or dissolving mucin; an agent that so acts : a mucopolysaccharide or glycoprotein, the chief constituent of mucus. [EU]

Mucoproteins: Conjugated proteins in which mucopolysaccharides are combined with proteins. The mucopolysaccharide moiety is the predominant group with the protein making up only a small percentage of the total weight. [NIH]

Mucosa: A mucous membrane, or tunica mucosa. [EU]

Mucus: The viscous secretion of mucous membranes. It contains mucin, white blood cells, water, inorganic salts, and exfoliated cells. [NIH]

Multidose: Occurring in, or using multiple doses. [EU]

Muscular Dystrophies: A general term for a group of inherited disorders which are characterized by progressive degeneration of skeletal muscles. [NIH]

Mutagenic: Inducing genetic mutation. [EU]

Mydriatic: 1. Dilating the pupil. 2. Any drug that dilates the pupil. [EU]

Myocardium: The muscle tissue of the heart composed of striated, involuntary muscle known as cardiac muscle. [NIH]

Myopia: That error of refraction in which rays of light entering the eye parallel to the optic axis are brought to a focus in front of the retina, as a result of the eyeball being too long from front to back (axial m.) or of an increased strength in refractive power of the media of the eye (index m.). Called also nearsightedness, because the near point is less distant than it is in emmetropia with an equal amplitude of accommodation. [EU]

Naive: Used to describe an individual who has never taken a certain drug or class of drugs (e. g., AZT-naive, antiretroviral-naive), or to refer to an undifferentiated immune system cell. [NIH]

NCI: National Cancer Institute. NCI, part of the National Institutes of Health of the United States Department of Health and Human Services, is the federal government's principal agency for cancer research. NCI conducts, coordinates, and funds cancer research, training, health information dissemination, and other programs with respect to the cause, diagnosis, prevention, and treatment of cancer. Access the NCI Web site at http://cancer.gov. [NIH]

Nearsightedness: The common term for myopia. [NIH]

Need: A state of tension or dissatisfaction felt by an individual that impels him to action toward a goal he believes will satisfy the impulse. [NIH]

Neonatal: Pertaining to the first four weeks after birth. [EU]

Nerve: A cordlike structure of nervous tissue that connects parts of the nervous system with other tissues of the body and conveys nervous impulses to, or away from, these tissues. [NIH]

Nervous System: The entire nerve apparatus composed of the brain, spinal cord, nerves and ganglia. [NIH]

Neural: 1. Pertaining to a nerve or to the nerves. 2. Situated in the region of the spinal axis, as the neutral arch. [EU]

Neuronal: Pertaining to a neuron or neurons (= conducting cells of the nervous system). [EU]

Neuroretinitis: Inflammation of the optic nerve head and adjacent retina. [NIH]

Neurotransmitter: Any of a group of substances that are released on excitation from the axon terminal of a presynaptic neuron of the central or peripheral nervous system and travel across the synaptic cleft to either excite or inhibit the target cell. Among the many substances that have the properties of a neurotransmitter are acetylcholine, norepinephrine, epinephrine, dopamine, glycine, y-aminobutyrate, glutamic acid, substance P, enkephalins, endorphins, and serotonin. [EU]

Neutralization: An act or process of neutralizing. [EU]

Neutrons: Electrically neutral elementary particles found in all atomic nuclei except light hydrogen; the mass is equal to that of the proton and electron combined and they are unstable when isolated from the nucleus, undergoing beta decay. Slow, thermal, epithermal, and fast neutrons refer to the energy levels with which the neutrons are ejected from heavier nuclei during their decay. [NIH]

Night Blindness: Anomaly of vision in which there is a pronounced inadequacy or complete absence of dark-adaptation. [NIH]

Nitrogen: An element with the atomic symbol N, atomic number 7, and atomic weight 14. Nitrogen exists as a diatomic gas and makes up about 78% of the earth's atmosphere by volume. It is a constituent of proteins and nucleic acids and found in all living cells. [NIH]

Nuclear: A test of the structure, blood flow, and function of the kidneys. The doctor injects a mildly radioactive solution into an arm vein and uses x-rays to monitor its progress through the kidneys. [NIH]

Nuclei: A body of specialized protoplasm found in nearly all cells and containing the chromosomes. [NIH]

Nucleic acid: Either of two types of macromolecule (DNA or RNA) formed by polymerization of nucleotides. Nucleic acids are found in all living cells and contain the information (genetic code) for the transfer of genetic information from one generation to the next. [NIH]

Nucleus: A body of specialized protoplasm found in nearly all cells and containing the chromosomes. [NIH]

Nylons: Polymers where the main polymer chain comprises recurring amide groups. These compounds are generally formed from combinations of diamines, diacids, and amino acids and yield fibers, sheeting, or extruded forms used in textiles, gels, filters, sutures, contact lenses, and other biomaterials. [NIH]

Nymph: The immature stage in the life cycle of those orders of insects characterized by gradual metamorphosis, in which the young resemble the imago in general form of body, including compound eyes and external wings; also the 8-legged stage of mites and ticks that follows the first moult. [NIH]

Nystagmus: Rhythmical oscillation of the eyeballs, either pendular or jerky. [NIH]

Ocular: 1. Of, pertaining to, or affecting the eye. 2. Eyepiece. [EU]

Odds Ratio: The ratio of two odds. The exposure-odds ratio for case control data is the ratio of the odds in favor of exposure among cases to the odds in favor of exposure among noncases. The disease-odds ratio for a cohort or cross section is the ratio of the odds in favor of disease among the exposed to the odds in favor of disease among the unexposed. The prevalence-odds ratio refers to an odds ratio derived cross-sectionally from studies of prevalent cases. [NIH]

Odour: A volatile emanation that is perceived by the sense of smell. [EU]

Opacity: Degree of density (area most dense taken for reading). [NIH]

Ophthalmic: Pertaining to the eye. [EU]

Ophthalmologist: A medical doctor specializing in the diagnosis and medical or surgical treatment of visual disorders and eye disease. [NIH]

Ophthalmology: A surgical specialty concerned with the structure and function of the eye and the medical and surgical treatment of its defects and diseases. [NIH]

Ophthalmoscope: A lighted instrument used to examine the inside of the eye, including the retina and the optic nerve. [NIH]

Ophthalmoscopy: Examination of the interior of the eye with an ophthalmoscope. [NIH]

Opsin: A protein formed, together with retinene, by the chemical breakdown of meta-rhodopsin. [NIH]

Optic Chiasm: The X-shaped structure formed by the meeting of the two optic nerves. At the optic chiasm the fibers from the medial part of each retina cross to project to the other side of the brain while the lateral retinal fibers continue on the same side. As a result each half of the brain receives information about the contralateral visual field from both eyes. [NIH]

Optic cup: The white, cup-like area in the center of the optic disc. [NIH]

Optic Nerve: The 2nd cranial nerve. The optic nerve conveys visual information from the retina to the brain. The nerve carries the axons of the retinal ganglion cells which sort at the optic chiasm and continue via the optic tracts to the brain. The largest projection is to the lateral geniculate nuclei; other important targets include the superior colliculi and the suprachiasmatic nuclei. Though known as the second cranial nerve, it is considered part of the central nervous system. [NIH]

Optician: An expert in the art and science of making and fitting glasses and may also dispense contact lenses. [NIH]

Optometrist: A primary eye care provider who diagnoses, manages, and treats disorders of the visual system and eye diseases. [NIH]

Orbit: One of the two cavities in the skull which contains an eyeball. Each eye is located in a bony socket or orbit. [NIH]

Osmolality: The concentration of osmotically active particles in solution expressed in terms of osmoles of solute per kilogram of solvent. The osmolality is directly proportional to the colligative properties of solutions; osmotic pressure, boiling point elevation, freezing point depression, and vapour pressure lowering. [EU]

Osmolarity: The concentration of osmotically active particles expressed in terms of osmoles of solute per litre of solution. [EU]

Osmoles: The standard unit of osmotic pressure. [NIH]

Osmosis: Tendency of fluids (e.g., water) to move from the less concentrated to the more concentrated side of a semipermeable membrane. [NIH]

Osmotic: Pertaining to or of the nature of osmosis (= the passage of pure solvent from a solution of lesser to one of greater solute concentration when the two solutions are separated by a membrane which selectively prevents the passage of solute molecules, but is permeable to the solvent). [EU]

Ownership: The legal relation between an entity (individual, group, corporation, or-profit, secular, government) and an object. The object may be corporeal, such as equipment, or completely a creature of law, such as a patent; it may be movable, such as an animal, or immovable, such as a building. [NIH]

Oxidants: Oxidizing agents or electron-accepting molecules in chemical reactions in which electrons are transferred from one molecule to another (oxidation-reduction). In vivo, it appears that phagocyte-generated oxidants function as tumor promoters or cocarcinogens rather than as complete carcinogens perhaps because of the high levels of endogenous antioxidant defenses. It is also thought that oxidative damage in joints may trigger the autoimmune response that characterizes the persistence of the rheumatoid disease process. [NIH]

Oxidation: The act of oxidizing or state of being oxidized. Chemically it consists in the increase of positive charges on an atom or the loss of negative charges. Most biological oxidations are accomplished by the removal of a pair of hydrogen atoms (dehydrogenation) from a molecule. Such oxidations must be accompanied by reduction of an acceptor molecule. Univalent o. indicates loss of one electron; divalent o., the loss of two electrons. [EU]

Oxidation-Reduction: A chemical reaction in which an electron is transferred from one molecule to another. The electron-donating molecule is the reducing agent or reductant; the electron-accepting molecule is the oxidizing agent or oxidant. Reducing and oxidizing agents function as conjugate reductant-oxidant pairs or redox pairs (Lehninger, Principles of Biochemistry, 1982, p471). [NIH]

Oxides: Binary compounds of oxygen containing the anion O(2-). The anion combines with metals to form alkaline oxides and non-metals to form acidic oxides. [NIH]

Oxygen Consumption: The oxygen consumption is determined by calculating the difference between the amount of oxygen inhaled and exhaled. [NIH]

Oxygenation: The process of supplying, treating, or mixing with oxygen. No:1245 - oxygenation the process of supplying, treating, or mixing with oxygen. [EU]

Pancreas: A mixed exocrine and endocrine gland situated transversely across the posterior abdominal wall in the epigastric and hypochondriac regions. The endocrine portion is comprised of the Islets of Langerhans, while the exocrine portion is a compound acinar gland that secretes digestive enzymes. [NIH]

Papain: A proteolytic enzyme obtained from Carica papaya. It is also the name used for a purified mixture of papain and chymopapain that is used as a topical enzymatic debriding agent. EC 3.4.22.2. [NIH]

Papilla: A small nipple-shaped elevation. [NIH]

Papillary: Pertaining to or resembling papilla, or nipple. [EU]

Paralysis: Loss of ability to move all or part of the body. [NIH]

Patient Compliance: Voluntary cooperation of the patient in following a prescribed regimen. [NIH]

Patient Education: The teaching or training of patients concerning their own health needs.

[NIH]

Patient Satisfaction: The degree to which the individual regards the health care service or product or the manner in which it is delivered by the provider as useful, effective, or beneficial. [NIH]

Patient Selection: Criteria and standards used for the determination of the appropriateness of the inclusion of patients with specific conditions in proposed treatment plans and the criteria used for the inclusion of subjects in various clinical trials and other research protocols. [NIH]

Penicillamine: 3-Mercapto-D-valine. The most characteristic degradation product of the penicillin antibiotics. It is used as an antirheumatic and as a chelating agent in Wilson's disease. [NIH]

Penicillin: An antibiotic drug used to treat infection. [NIH]

Penicillinase: A beta-lactamase preferentially cleaving penicillins. (Dorland, 28th ed) EC 3.5.2.-. [NIH]

Peptide: Any compound consisting of two or more amino acids, the building blocks of proteins. Peptides are combined to make proteins. [NIH]

Peracetic Acid: A liquid that functions as a strong oxidizing agent. It has an acrid odor and is used as a disinfectant. [NIH]

Perforation: 1. The act of boring or piercing through a part. 2. A hole made through a part or substance. [EU]

Perfusion: Bathing an organ or tissue with a fluid. In regional perfusion, a specific area of the body (usually an arm or a leg) receives high doses of anticancer drugs through a blood vessel. Such a procedure is performed to treat cancer that has not spread. [NIH]

Peripheral vision: Side vision; ability to see objects and movement outside of the direct line of vision. [NIH]

Peroxide: Chemical compound which contains an atom group with two oxygen atoms tied to each other. [NIH]

Phagocyte: An immune system cell that can surround and kill microorganisms and remove dead cells. Phagocytes include macrophages. [NIH]

Phallic: Pertaining to the phallus, or penis. [EU]

Pharmaceutical Preparations: Drugs intended for human or veterinary use, presented in their finished dosage form. Included here are materials used in the preparation and/or formulation of the finished dosage form. [NIH]

Pharmacologic: Pertaining to pharmacology or to the properties and reactions of drugs. [EU]

Phospholipids: Lipids containing one or more phosphate groups, particularly those derived from either glycerol (phosphoglycerides; glycerophospholipids) or sphingosine (sphingolipids). They are polar lipids that are of great importance for the structure and function of cell membranes and are the most abundant of membrane lipids, although not stored in large amounts in the system. [NIH]

Phosphorus: A non-metallic element that is found in the blood, muscles, nevers, bones, and teeth, and is a component of adenosine triphosphate (ATP; the primary energy source for the body's cells.) [NIH]

Photokeratoscopy: Determination of corneal curvatines and topography by observing or photographing the corneal image of the target of a photokeratoscope. [NIH]

Photophobia: Abnormal sensitivity to light. This may occur as a manifestation of eye diseases; migraine; subarachnoid hemorrhage; meningitis; and other disorders. Photophobia

may also occur in association with depression and other mental disorders. [NIH]

Physical Examination: Systematic and thorough inspection of the patient for physical signs of disease or abnormality. [NIH]

Physiologic: Having to do with the functions of the body. When used in the phrase "physiologic age," it refers to an age assigned by general health, as opposed to calendar age. [NIH]

Physiology: The science that deals with the life processes and functions of organismus, their cells, tissues, and organs. [NIH]

Pigments: Any normal or abnormal coloring matter in plants, animals, or micro-organisms. [NIH]

Pilot study: The initial study examining a new method or treatment. [NIH]

Plana: The radiographic term applied to a vertebral body crushed to a thin plate. [NIH]

Plants: Multicellular, eukaryotic life forms of the kingdom Plantae. They are characterized by a mainly photosynthetic mode of nutrition; essentially unlimited growth at localized regions of cell divisions (meristems); cellulose within cells providing rigidity; the absence of organs of locomotion; absense of nervous and sensory systems; and an alteration of haploid and diploid generations. [NIH]

Plaque: A clear zone in a bacterial culture grown on an agar plate caused by localized destruction of bacterial cells by a bacteriophage. The concentration of infective virus in a fluid can be estimated by applying the fluid to a culture and counting the number of. [NIH]

Plasma: The clear, yellowish, fluid part of the blood that carries the blood cells. The proteins that form blood clots are in plasma. [NIH]

Plasma cells: A type of white blood cell that produces antibodies. [NIH]

Plasma protein: One of the hundreds of different proteins present in blood plasma, including carrier proteins (such albumin, transferrin, and haptoglobin), fibrinogen and other coagulation factors, complement components, immunoglobulins, enzyme inhibitors, precursors of substances such as angiotension and bradykinin, and many other types of proteins. [EU]

Plasticizers: Materials incorporated mechanically in plastics (usually PVC) to increase flexibility, workability or distensibility; due to the non-chemical inclusion, plasticizers leach out from the plastic and are found in body fluids and the general environment. [NIH]

Platinum: Platinum. A heavy, soft, whitish metal, resembling tin, atomic number 78, atomic weight 195.09, symbol Pt. (From Dorland, 28th ed) It is used in manufacturing equipment for laboratory and industrial use. It occurs as a black powder (platinum black) and as a spongy substance (spongy platinum) and may have been known in Pliny's time as "alutiae". [NIH]

Pneumonia: Inflammation of the lungs. [NIH]

Poisoning: A condition or physical state produced by the ingestion, injection or inhalation of, or exposure to a deleterious agent. [NIH]

Polyesters: Polymers of organic acids and alcohols, with ester linkages--usually polyethylene terephthalate; can be cured into hard plastic, films or tapes, or fibers which can be woven into fabrics, meshes or velours. [NIH]

Polyethylene: A vinyl polymer made from ethylene. It can be branched or linear. Branched or low-density polyethylene is tough and pliable but not to the same degree as linear polyethylene. Linear or high-density polyethylene has a greater hardness and tensile strength. Polyethylene is used in a variety of products, including implants and prostheses. [NIH]

Polyhydroxyethyl Methacrylate: A biocompatible, hydrophilic, inert gel that is permeable to tissue fluids. It is used as an embedding medium for microscopy, as a coating for implants and prostheses, for contact lenses, as microspheres in adsorption research, etc. [NIH]

Polymers: Compounds formed by the joining of smaller, usually repeating, units linked by covalent bonds. These compounds often form large macromolecules (e.g., polypeptides, proteins, plastics). [NIH]

Polymethyl Methacrylate: Polymerized methyl methacrylate monomers which are used as sheets, moulding, extrusion powders, surface coating resins, emulsion polymers, fibers, inks, and films (From International Labor Organization, 1983). This material is also used in tooth implants, bone cements, and hard corneal contact lenses. [NIH]

Polysaccharide: A type of carbohydrate. It contains sugar molecules that are linked together chemically. [NIH]

Polyurethanes: A group of thermoplastic or thermosetting polymers containing polyisocyanate. They are used as elastomers, as coatings, as fibers and as foams. [NIH]

Polyvinyl Alcohol: A polymer prepared from polyvinyl acetates by replacement of the acetate groups with hydroxyl groups. It is used as a pharmaceutic aid and ophthalmic lubricant as well as in the manufacture of surface coatings artificial sponges, cosmetics, and other products. [NIH]

Polyvinyl Chloride: A polyvinyl resin used extensively in the manufacture of plastics, including medical devices, tubing, and other packaging. It is also used as a rubber substitute. [NIH]

Population Density: Number of individuals in a population relative to space. [NIH]

Posterior: Situated in back of, or in the back part of, or affecting the back or dorsal surface of the body. In lower animals, it refers to the caudal end of the body. [EU]

Postoperative: After surgery. [NIH]

Potassium: An element that is in the alkali group of metals. It has an atomic symbol K, atomic number 19, and atomic weight 39.10. It is the chief cation in the intracellular fluid of muscle and other cells. Potassium ion is a strong electrolyte and it plays a significant role in the regulation of fluid volume and maintenance of the water-electrolyte balance. [NIH]

Practice Guidelines: Directions or principles presenting current or future rules of policy for the health care practitioner to assist him in patient care decisions regarding diagnosis, therapy, or related clinical circumstances. The guidelines may be developed by government agencies at any level, institutions, professional societies, governing boards, or by the convening of expert panels. The guidelines form a basis for the evaluation of all aspects of health care and delivery. [NIH]

Precursor: Something that precedes. In biological processes, a substance from which another, usually more active or mature substance is formed. In clinical medicine, a sign or symptom that heralds another. [EU]

Prednisolone: A glucocorticoid with the general properties of the corticosteroids. It is the drug of choice for all conditions in which routine systemic corticosteroid therapy is indicated, except adrenal deficiency states. [NIH]

Preoperative: Preceding an operation. [EU]

Presbyopia: The normal decreasing elasticity of the crystalline lens that leads to loss of accommodation. [NIH]

Prevalence: The total number of cases of a given disease in a specified population at a designated time. It is differentiated from incidence, which refers to the number of new cases

in the population at a given time. [NIH]

Progesterone: Pregn-4-ene-3,20-dione. The principal progestational hormone of the body, secreted by the corpus luteum, adrenal cortex, and placenta. Its chief function is to prepare the uterus for the reception and development of the fertilized ovum. It acts as an antiovulatory agent when administered on days 5-25 of the menstrual cycle. [NIH]

Progression: Increase in the size of a tumor or spread of cancer in the body. [NIH]

Progressive: Advancing; going forward; going from bad to worse; increasing in scope or severity. [EU]

Projection: A defense mechanism, operating unconsciously, whereby that which is emotionally unacceptable in the self is rejected and attributed (projected) to others. [NIH]

Proline: A non-essential amino acid that is synthesized from glutamic acid. It is an essential component of collagen and is important for proper functioning of joints and tendons. [NIH]

Prophylaxis: An attempt to prevent disease. [NIH]

Proportional: Being in proportion : corresponding in size, degree, or intensity, having the same or a constant ratio; of, relating to, or used in determining proportions. [EU]

Prospective study: An epidemiologic study in which a group of individuals (a cohort), all free of a particular disease and varying in their exposure to a possible risk factor, is followed over a specific amount of time to determine the incidence rates of the disease in the exposed and unexposed groups. [NIH]

Prosthesis: An artificial replacement of a part of the body. [NIH]

Protease: Proteinase (= any enzyme that catalyses the splitting of interior peptide bonds in a protein). [EU]

Protein C: A vitamin-K dependent zymogen present in the blood, which, upon activation by thrombin and thrombomodulin exerts anticoagulant properties by inactivating factors Va and VIIIa at the rate-limiting steps of thrombin formation. [NIH]

Protein S: The vitamin K-dependent cofactor of activated protein C. Together with protein C, it inhibits the action of factors VIIIa and Va. A deficiency in protein S can lead to recurrent venous and arterial thrombosis. [NIH]

Proteins: Polymers of amino acids linked by peptide bonds. The specific sequence of amino acids determines the shape and function of the protein. [NIH]

Proteolytic: 1. Pertaining to, characterized by, or promoting proteolysis. 2. An enzyme that promotes proteolysis (= the splitting of proteins by hydrolysis of the peptide bonds with formation of smaller polypeptides). [EU]

Prothrombin: A plasma protein that is the inactive precursor of thrombin. It is converted to thrombin by a prothrombin activator complex consisting of factor Xa, factor V, phospholipid, and calcium ions. Deficiency of prothrombin leads to hypoprothrombinemia. [NIH]

Protocol: The detailed plan for a clinical trial that states the trial's rationale, purpose, drug or vaccine dosages, length of study, routes of administration, who may participate, and other aspects of trial design. [NIH]

Protons: Stable elementary particles having the smallest known positive charge, found in the nuclei of all elements. The proton mass is less than that of a neutron. A proton is the nucleus of the light hydrogen atom, i.e., the hydrogen ion. [NIH]

Protozoa: A subkingdom consisting of unicellular organisms that are the simplest in the animal kingdom. Most are free living. They range in size from submicroscopic to macroscopic. Protozoa are divided into seven phyla: Sarcomastigophora,

Labyrinthomorpha, Apicomplexa, Microspora, Ascetospora, Myxozoa, and Ciliophora. [NIH]

Pseudophakia: Presence of an intraocular lens after cataract extraction. [NIH]

Psychiatry: The medical science that deals with the origin, diagnosis, prevention, and treatment of mental disorders. [NIH]

Psychic: Pertaining to the psyche or to the mind; mental. [EU]

Ptosis: 1. Prolapse of an organ or part. 2. Drooping of the upper eyelid from paralysis of the third nerve or from sympathetic innervation. [EU]

Public Health: Branch of medicine concerned with the prevention and control of disease and disability, and the promotion of physical and mental health of the population on the international, national, state, or municipal level. [NIH]

Public Policy: A course or method of action selected, usually by a government, from among alternatives to guide and determine present and future decisions. [NIH]

Pulmonary: Relating to the lungs. [NIH]

Pulmonary Artery: The short wide vessel arising from the conus arteriosus of the right ventricle and conveying unaerated blood to the lungs. [NIH]

Pulmonary Edema: An accumulation of an excessive amount of watery fluid in the lungs, may be caused by acute exposure to dangerous concentrations of irritant gasses. [NIH]

Pulmonary hypertension: Abnormally high blood pressure in the arteries of the lungs. [NIH]

Pulse: The rhythmical expansion and contraction of an artery produced by waves of pressure caused by the ejection of blood from the left ventricle of the heart as it contracts. [NIH]

Pupa: An inactive stage between the larval and adult stages in the life cycle of insects. [NIH]

Pupil: The aperture in the iris through which light passes. [NIH]

Purulent: Consisting of or containing pus; associated with the formation of or caused by pus. [EU]

Quaternary: 1. Fourth in order. 2. Containing four elements or groups. [EU]

Radial Keratotomy: Commonly referred to as RK; a surgical procedure designed to correct myopia (nearsightedness) by flattening the cornea using radial cuts. [NIH]

Radiation: Emission or propagation of electromagnetic energy (waves/rays), or the waves/rays themselves; a stream of electromagnetic particles (electrons, neutrons, protons, alpha particles) or a mixture of these. The most common source is the sun. [NIH]

Radioactive: Giving off radiation. [NIH]

Radius: The lateral bone of the forearm. [NIH]

Randomized: Describes an experiment or clinical trial in which animal or human subjects are assigned by chance to separate groups that compare different treatments. [NIH]

Reagent: A substance employed to produce a chemical reaction so as to detect, measure, produce, etc., other substances. [EU]

Receptor: A molecule inside or on the surface of a cell that binds to a specific substance and causes a specific physiologic effect in the cell. [NIH]

Rectum: The last 8 to 10 inches of the large intestine. [NIH]

Recurrence: The return of a sign, symptom, or disease after a remission. [NIH]

Refer: To send or direct for treatment, aid, information, de decision. [NIH]

Reflex: An involuntary movement or exercise of function in a part, excited in response to a

stimulus applied to the periphery and transmitted to the brain or spinal cord. [NIH]

Refraction: A test to determine the best eyeglasses or contact lenses to correct a refractive error (myopia, hyperopia, or astigmatism). [NIH]

Refractive Errors: Deviations from the average or standard indices of refraction of the eye through its dioptric or refractive apparatus. [NIH]

Refractive Power: The ability of an object, such as the eye, to bend light as light passes through it. [NIH]

Refractometer: Any of several objective or subjective devices for measuring the refractive state of an eye. [NIH]

Regimen: A treatment plan that specifies the dosage, the schedule, and the duration of treatment. [NIH]

Relative risk: The ratio of the incidence rate of a disease among individuals exposed to a specific risk factor to the incidence rate among unexposed individuals; synonymous with risk ratio. Alternatively, the ratio of the cumulative incidence rate in the exposed to the cumulative incidence rate in the unexposed (cumulative incidence ratio). The term relative risk has also been used synonymously with odds ratio. This is because the odds ratio and relative risk approach each other if the disease is rare (5 percent of population) and the number of subjects is large. [NIH]

Reliability: Used technically, in a statistical sense, of consistency of a test with itself, i. e. the extent to which we can assume that it will yield the same result if repeated a second time. [NIH]

Reoperation: A repeat operation for the same condition in the same patient. It includes reoperation for reexamination, reoperation for disease progression or recurrence, or reoperation following operative failure. [NIH]

Respiration: The act of breathing with the lungs, consisting of inspiration, or the taking into the lungs of the ambient air, and of expiration, or the expelling of the modified air which contains more carbon dioxide than the air taken in (Blakiston's Gould Medical Dictionary, 4th ed.). This does not include tissue respiration (= oxygen consumption) or cell respiration (= cell respiration). [NIH]

Retina: The ten-layered nervous tissue membrane of the eye. It is continuous with the optic nerve and receives images of external objects and transmits visual impulses to the brain. Its outer surface is in contact with the choroid and the inner surface with the vitreous body. The outer-most layer is pigmented, whereas the inner nine layers are transparent. [NIH]

Retinae: A congenital notch or cleft of the retina, usually located inferiorly. [NIH]

Retinal: 1. Pertaining to the retina. 2. The aldehyde of retinol, derived by the oxidative enzymatic splitting of absorbed dietary carotene, and having vitamin A activity. In the retina, retinal combines with opsins to form visual pigments. One isomer, 11-cis retinal combines with opsin in the rods (scotopsin) to form rhodopsin, or visual purple. Another, all-trans retinal (trans-r.); visual yellow; xanthopsin) results from the bleaching of rhodopsin by light, in which the 11-cis form is converted to the all-trans form. Retinal also combines with opsins in the cones (photopsins) to form the three pigments responsible for colour vision. Called also retinal, and retinene1. [EU]

Retinal Detachment: Separation of the inner layers of the retina (neural retina) from the pigment epithelium. Retinal detachment occurs more commonly in men than in women, in eyes with degenerative myopia, in aging and in aphakia. It may occur after an uncomplicated cataract extraction, but it is seen more often if vitreous humor has been lost during surgery. (Dorland, 27th ed; Newell, Ophthalmology: Principles and Concepts, 7th ed, p310-12). [NIH]

Retinal Ganglion Cells: Cells of the innermost nuclear layer of the retina, the ganglion cell layer, which project axons through the optic nerve to the brain. They are quite variable in size and in the shapes of their dendritic arbors, which are generally confined to the inner plexiform layer. [NIH]

Retinitis: Inflammation of the retina. It is rarely limited to the retina, but is commonly associated with diseases of the choroid (chorioretinitis) and of the optic nerve (neuroretinitis). The disease may be confined to one eye, but since it is generally dependent on a constitutional factor, it is almost always bilateral. It may be acute in course, but as a rule it lasts many weeks or even several months. [NIH]

Retinitis Pigmentosa: Hereditary, progressive degeneration of the neuroepithelium of the retina characterized by night blindness and progressive contraction of the visual field. [NIH]

Retinol: Vitamin A. It is essential for proper vision and healthy skin and mucous membranes. Retinol is being studied for cancer prevention; it belongs to the family of drugs called retinoids. [NIH]

Retrospective: Looking back at events that have already taken place. [NIH]

Retrospective study: A study that looks backward in time, usually using medical records and interviews with patients who already have or had a disease. [NIH]

Rheumatoid: Resembling rheumatism. [EU]

Rhodopsin: A photoreceptor protein found in retinal rods. It is a complex formed by the binding of retinal, the oxidized form of retinol, to the protein opsin and undergoes a series of complex reactions in response to visible light resulting in the transmission of nerve impulses to the brain. [NIH]

Ribosome: A granule of protein and RNA, synthesized in the nucleolus and found in the cytoplasm of cells. Ribosomes are the main sites of protein synthesis. Messenger RNA attaches to them and there receives molecules of transfer RNA bearing amino acids. [NIH]

Rigidity: Stiffness or inflexibility, chiefly that which is abnormal or morbid; rigor. [EU]

Risk factor: A habit, trait, condition, or genetic alteration that increases a person's chance of developing a disease. [NIH]

Rod: A reception for vision, located in the retina. [NIH]

Rubber: A high-molecular-weight polymeric elastomer derived from the milk juice (latex) of Hevea brasiliensis and other trees. It is a substance that can be stretched at room temperature to atleast twice its original length and after releasing the stress, retractrapidly, and recover its original dimensions fully. Synthetic rubber is made from many different chemicals, including styrene, acrylonitrile, ethylene, propylene, and isoprene. [NIH]

Sagittal: The line of direction passing through the body from back to front, or any vertical plane parallel to the medial plane of the body and inclusive of that plane; often restricted to the medial plane, the plane of the sagittal suture. [NIH]

Salivary: The duct that convey saliva to the mouth. [NIH]

Salivary glands: Glands in the mouth that produce saliva. [NIH]

Sanitation: The development and establishment of environmental conditions favorable to the health of the public. [NIH]

Saponins: Sapogenin glycosides. A type of glycoside widely distributed in plants. Each consists of a sapogenin as the aglycon moiety, and a sugar. The sapogenin may be a steroid or a triterpene and the sugar may be glucose, galactose, a pentose, or a methylpentose. Sapogenins are poisonous towards the lower forms of life and are powerful hemolytics when injected into the blood stream able to dissolve red blood cells at even extreme

dilutions. [NIH]

Scatter: The extent to which relative success and failure are divergently manifested in qualitatively different tests. [NIH]

Sclera: The tough white outer coat of the eyeball, covering approximately the posterior five-sixths of its surface, and continuous anteriorly with the cornea and posteriorly with the external sheath of the optic nerve. [EU]

Screening: Checking for disease when there are no symptoms. [NIH]

Sebaceous: Gland that secretes sebum. [NIH]

Sebaceous gland: Gland that secretes sebum. [NIH]

Sebum: The oily substance secreted by sebaceous glands. It is composed of keratin, fat, and cellular debris. [NIH]

Secretion: 1. The process of elaborating a specific product as a result of the activity of a gland; this activity may range from separating a specific substance of the blood to the elaboration of a new chemical substance. 2. Any substance produced by secretion. [EU]

Secretory: Secreting; relating to or influencing secretion or the secretions. [NIH]

Secretory Vesicles: Vesicles derived from the golgi apparatus containing material to be released at the cell surface. [NIH]

Sediment: A precipitate, especially one that is formed spontaneously. [EU]

Semisynthetic: Produced by chemical manipulation of naturally occurring substances. [EU]

Sensitization: 1. Administration of antigen to induce a primary immune response; priming; immunization. 2. Exposure to allergen that results in the development of hypersensitivity. 3. The coating of erythrocytes with antibody so that they are subject to lysis by complement in the presence of homologous antigen, the first stage of a complement fixation test. [EU]

Septic: Produced by or due to decomposition by microorganisms; putrefactive. [EU]

Serous: Having to do with serum, the clear liquid part of blood. [NIH]

Serum: The clear liquid part of the blood that remains after blood cells and clotting proteins have been removed. [NIH]

Serum Albumin: A major plasma protein that serves in maintaining the plasma colloidal osmotic pressure and transporting large organic anions. [NIH]

Sharpness: The apparent blurring of the border between two adjacent areas of a radiograph having different optical densities. [NIH]

Shock: The general bodily disturbance following a severe injury; an emotional or moral upset occasioned by some disturbing or unexpected experience; disruption of the circulation, which can upset all body functions: sometimes referred to as circulatory shock. [NIH]

Side effect: A consequence other than the one(s) for which an agent or measure is used, as the adverse effects produced by a drug, especially on a tissue or organ system other than the one sought to be benefited by its administration. [EU]

Silicon: A trace element that constitutes about 27.6% of the earth's crust in the form of silicon dioxide. It does not occur free in nature. Silicon has the atomic symbol Si, atomic number 14, and atomic weight 28.09. [NIH]

Silicon Dioxide: Silica. Transparent, tasteless crystals found in nature as agate, amethyst, chalcedony, cristobalite, flint, sand, quartz, and tridymite. The compound is insoluble in water or acids except hydrofluoric acid. [NIH]

Skeleton: The framework that supports the soft tissues of vertebrate animals and protects

many of their internal organs. The skeletons of vertebrates are made of bone and/or cartilage. [NIH]

Skull: The skeleton of the head including the bones of the face and the bones enclosing the brain. [NIH]

Sodium: An element that is a member of the alkali group of metals. It has the atomic symbol Na, atomic number 11, and atomic weight 23. With a valence of 1, it has a strong affinity for oxygen and other nonmetallic elements. Sodium provides the chief cation of the extracellular body fluids. Its salts are the most widely used in medicine. (From Dorland, 27th ed) Physiologically the sodium ion plays a major role in blood pressure regulation, maintenance of fluid volume, and electrolyte balance. [NIH]

Soft tissue: Refers to muscle, fat, fibrous tissue, blood vessels, or other supporting tissue of the body. [NIH]

Solvent: 1. Dissolving; effecting a solution. 2. A liquid that dissolves or that is capable of dissolving; the component of a solution that is present in greater amount. [EU]

Sorbic Acid: Mold and yeast inhibitor. Used as a fungistatic agent for foods, especially cheeses. [NIH]

Sorbitol: A polyhydric alcohol with about half the sweetness of sucrose. Sorbitol occurs naturally and is also produced synthetically from glucose. It was formerly used as a diuretic and may still be used as a laxative and in irrigating solutions for some surgical procedures. It is also used in many manufacturing processes, as a pharmaceutical aid, and in several research applications. [NIH]

Specialist: In medicine, one who concentrates on 1 special branch of medical science. [NIH]

Species: A taxonomic category subordinate to a genus (or subgenus) and superior to a subspecies or variety, composed of individuals possessing common characters distinguishing them from other categories of individuals of the same taxonomic level. In taxonomic nomenclature, species are designated by the genus name followed by a Latin or Latinized adjective or noun. [EU]

Specificity: Degree of selectivity shown by an antibody with respect to the number and types of antigens with which the antibody combines, as well as with respect to the rates and the extents of these reactions. [NIH]

Spectroscopic: The recognition of elements through their emission spectra. [NIH]

Spectrum: A charted band of wavelengths of electromagnetic vibrations obtained by refraction and diffraction. By extension, a measurable range of activity, such as the range of bacteria affected by an antibiotic (antibacterial s.) or the complete range of manifestations of a disease. [EU]

Spinal cord: The main trunk or bundle of nerves running down the spine through holes in the spinal bone (the vertebrae) from the brain to the level of the lower back. [NIH]

Spores: The reproductive elements of lower organisms, such as protozoa, fungi, and cryptogamic plants. [NIH]

Stabilization: The creation of a stable state. [EU]

Staging: Performing exams and tests to learn the extent of the cancer within the body, especially whether the disease has spread from the original site to other parts of the body. [NIH]

Stenosis: Narrowing or stricture of a duct or canal. [EU]

Sterile: Unable to produce children. [NIH]

Sterilization: The destroying of all forms of life, especially microorganisms, by heat,

chemical, or other means. [NIH]

Steroid: A group name for lipids that contain a hydrogenated cyclopentanoperhydrophenanthrene ring system. Some of the substances included in this group are progesterone, adrenocortical hormones, the gonadal hormones, cardiac aglycones, bile acids, sterols (such as cholesterol), toad poisons, saponins, and some of the carcinogenic hydrocarbons. [EU]

Stimulus: That which can elicit or evoke action (response) in a muscle, nerve, gland or other excitable issue, or cause an augmenting action upon any function or metabolic process. [NIH]

Stomach: An organ of digestion situated in the left upper quadrant of the abdomen between the termination of the esophagus and the beginning of the duodenum. [NIH]

Strabismus: Deviation of the eye which the patient cannot overcome. The visual axes assume a position relative to each other different from that required by the physiological conditions. The various forms of strabismus are spoken of as tropias, their direction being indicated by the appropriate prefix, as cyclo tropia, esotropia, exotropia, hypertropia, and hypotropia. Called also cast, heterotropia, manifest deviation, and squint. [EU]

Strand: DNA normally exists in the bacterial nucleus in a helix, in which two strands are coiled together. [NIH]

Stress: Forcibly exerted influence; pressure. Any condition or situation that causes strain or tension. Stress may be either physical or psychologic, or both. [NIH]

Stricture: The abnormal narrowing of a body opening. Also called stenosis. [NIH]

Stroke: Sudden loss of function of part of the brain because of loss of blood flow. Stroke may be caused by a clot (thrombosis) or rupture (hemorrhage) of a blood vessel to the brain. [NIH]

Stroma: The middle, thickest layer of tissue in the cornea. [NIH]

Stromal: Large, veil-like cell in the bone marrow. [NIH]

Styrene: A colorless, toxic liquid with a strong aromatic odor. It is used to make rubbers, polymers and copolymers, and polystyrene plastics. [NIH]

Subacute: Somewhat acute; between acute and chronic. [EU]

Subclinical: Without clinical manifestations; said of the early stage(s) of an infection or other disease or abnormality before symptoms and signs become apparent or detectable by clinical examination or laboratory tests, or of a very mild form of an infection or other disease or abnormality. [EU]

Subcutaneous: Beneath the skin. [NIH]

Subspecies: A category intermediate in rank between species and variety, based on a smaller number of correlated characters than are used to differentiate species and generally conditioned by geographical and/or ecological occurrence. [NIH]

Substance P: An eleven-amino acid neurotransmitter that appears in both the central and peripheral nervous systems. It is involved in transmission of pain, causes rapid contractions of the gastrointestinal smooth muscle, and modulates inflammatory and immune responses. [NIH]

Suction: The removal of secretions, gas or fluid from hollow or tubular organs or cavities by means of a tube and a device that acts on negative pressure. [NIH]

Sulfur: An element that is a member of the chalcogen family. It has an atomic symbol S, atomic number 16, and atomic weight 32.066. It is found in the amino acids cysteine and methionine. [NIH]

Sunburn: An injury to the skin causing erythema, tenderness, and sometimes blistering and

resulting from excessive exposure to the sun. The reaction is produced by the ultraviolet radiation in sunlight. [NIH]

Supplementation: Adding nutrients to the diet. [NIH]

Support group: A group of people with similar disease who meet to discuss how better to cope with their cancer and treatment. [NIH]

Suppression: A conscious exclusion of disapproved desire contrary with repression, in which the process of exclusion is not conscious. [NIH]

Surfactant: A fat-containing protein in the respiratory passages which reduces the surface tension of pulmonary fluids and contributes to the elastic properties of pulmonary tissue. [NIH]

Surgery, Oral: A dental specialty concerned with the diagnosis and surgical treatment of disease, injuries, and defects of the human oral and maxillofacial region. [NIH]

Surgical Instruments: Hand-held tools or implements used by health professionals for the performance of surgical tasks. [NIH]

Symptomatic: Having to do with symptoms, which are signs of a condition or disease. [NIH]

Systemic: Affecting the entire body. [NIH]

Temporal: One of the two irregular bones forming part of the lateral surfaces and base of the skull, and containing the organs of hearing. [NIH]

Tetracycline: An antibiotic originally produced by Streptomyces viridifaciens, but used mostly in synthetic form. It is an inhibitor of aminoacyl-tRNA binding during protein synthesis. [NIH]

Thermal: Pertaining to or characterized by heat. [EU]

Thimerosal: A topical antiseptic used on skin and mucous membranes. It is also used as a preservative in pharmaceuticals. [NIH]

Thiourea: A photographic fixative used also in the manufacture of resins. According to the Fourth Annual Report on Carcinogens (NTP 85-002, 1985), this substance may reasonably be anticipated to be a carcinogen (Merck Index, 9th ed). Many of its derivatives are antithryoid agents and/or free radical scavengers. [NIH]

Threshold: For a specified sensory modality (e. g. light, sound, vibration), the lowest level (absolute threshold) or smallest difference (difference threshold, difference limen) or intensity of the stimulus discernible in prescribed conditions of stimulation. [NIH]

Thrombin: An enzyme formed from prothrombin that converts fibrinogen to fibrin. (Dorland, 27th ed) EC 3.4.21.5. [NIH]

Thrombomodulin: A cell surface glycoprotein of endothelial cells that binds thrombin and serves as a cofactor in the activation of protein C and its regulation of blood coagulation. [NIH]

Thrombosis: The formation or presence of a blood clot inside a blood vessel. [NIH]

Thyroid: A gland located near the windpipe (trachea) that produces thyroid hormone, which helps regulate growth and metabolism. [NIH]

Thyroxine: An amino acid of the thyroid gland which exerts a stimulating effect on thyroid metabolism. [NIH]

Tin: A trace element that is required in bone formation. It has the atomic symbol Sn, atomic number 50, and atomic weight 118.71. [NIH]

Tissue: A group or layer of cells that are alike in type and work together to perform a specific function. [NIH]

Tomography: Imaging methods that result in sharp images of objects located on a chosen plane and blurred images located above or below the plane. [NIH]

Tone: 1. The normal degree of vigour and tension; in muscle, the resistance to passive elongation or stretch; tonus. 2. A particular quality of sound or of voice. 3. To make permanent, or to change, the colour of silver stain by chemical treatment, usually with a heavy metal. [EU]

Tonicity: The normal state of muscular tension. [NIH]

Tonometer: For testing the intra-ocular tension. [NIH]

Tonometry: The standard to determine the fluid pressure inside the eye (intraocular pressure). [NIH]

Tonus: A state of slight tension usually present in muscles even when they are not undergoing active contraction. [NIH]

Tooth Preparation: Procedures carried out with regard to the teeth or tooth structures preparatory to specified dental therapeutic and surgical measures. [NIH]

Topical: On the surface of the body. [NIH]

Toxic: Having to do with poison or something harmful to the body. Toxic substances usually cause unwanted side effects. [NIH]

Toxicity: The quality of being poisonous, especially the degree of virulence of a toxic microbe or of a poison. [EU]

Toxicology: The science concerned with the detection, chemical composition, and pharmacologic action of toxic substances or poisons and the treatment and prevention of toxic manifestations. [NIH]

Toxins: Specific, characterizable, poisonous chemicals, often proteins, with specific biological properties, including immunogenicity, produced by microbes, higher plants, or animals. [NIH]

Trace element: Substance or element essential to plant or animal life, but present in extremely small amounts. [NIH]

Translation: The process whereby the genetic information present in the linear sequence of ribonucleotides in mRNA is converted into a corresponding sequence of amino acids in a protein. It occurs on the ribosome and is unidirectional. [NIH]

Translational: The cleavage of signal sequence that directs the passage of the protein through a cell or organelle membrane. [NIH]

Trauma: Any injury, wound, or shock, must frequently physical or structural shock, producing a disturbance. [NIH]

Trees: Woody, usually tall, perennial higher plants (Angiosperms, Gymnosperms, and some Pterophyta) having usually a main stem and numerous branches. [NIH]

Tricuspid Atresia: Absence of the orifice between the right atrium and ventricle, with the presence of an atrial defect through which all the systemic venous return reaches the left heart. As a result, there is left ventricular hypertrophy because the right ventricle is absent or not functional. [NIH]

Tryptophan: An essential amino acid that is necessary for normal growth in infants and for nitrogen balance in adults. It is a precursor serotonin and niacin. [NIH]

Tunica: A rather vague term to denote the lining coat of hollow organs, tubes, or cavities. [NIH]

Ulcer: A localized necrotic lesion of the skin or a mucous surface. [NIH]

Ultraviolet radiation: Invisible rays that are part of the energy that comes from the sun. UV radiation can damage the skin and cause melanoma and other types of skin cancer. UV radiation that reaches the earth's surface is made up of two types of rays, called UVA and UVB rays. UVB rays are more likely than UVA rays to cause sunburn, but UVA rays pass deeper into the skin. Scientists have long thought that UVB radiation can cause melanoma and other types of skin cancer. They now think that UVA radiation also may add to skin damage that can lead to skin cancer and cause premature aging. For this reason, skin specialists recommend that people use sunscreens that reflect, absorb, or scatter both kinds of UV radiation. [NIH]

Ultraviolet Rays: That portion of the electromagnetic spectrum immediately below the visible range and extending into the x-ray frequencies. The longer wavelengths (near-UV or biotic or vital rays) are necessary for the endogenous synthesis of vitamin D and are also called antirachitic rays; the shorter, ionizing wavelengths (far-UV or abiotic or extravital rays) are viricidal, bactericidal, mutagenic, and carcinogenic and are used as disinfectants. [NIH]

Unconscious: Experience which was once conscious, but was subsequently rejected, as the "personal unconscious". [NIH]

Universal Precautions: Prudent standard preventive measures to be taken by professional and other health personnel in contact with persons afflicted with a communicable disease, to avoid contracting the disease by contagion or infection. Precautions are especially applicable in the diagnosis and care of AIDS patients. [NIH]

Urea: A compound (CO(NH2)2), formed in the liver from ammonia produced by the deamination of amino acids. It is the principal end product of protein catabolism and constitutes about one half of the total urinary solids. [NIH]

Ureters: Tubes that carry urine from the kidneys to the bladder. [NIH]

Urethra: The tube through which urine leaves the body. It empties urine from the bladder. [NIH]

Urinalysis: Examination of urine by chemical, physical, or microscopic means. Routine urinalysis usually includes performing chemical screening tests, determining specific gravity, observing any unusual color or odor, screening for bacteriuria, and examining the sediment microscopically. [NIH]

Urinary: Having to do with urine or the organs of the body that produce and get rid of urine. [NIH]

Urinary tract: The organs of the body that produce and discharge urine. These include the kidneys, ureters, bladder, and urethra. [NIH]

Urine: Fluid containing water and waste products. Urine is made by the kidneys, stored in the bladder, and leaves the body through the urethra. [NIH]

Uterus: The small, hollow, pear-shaped organ in a woman's pelvis. This is the organ in which a fetus develops. Also called the womb. [NIH]

Uvea: The middle coat of the eyeball, consisting of the choroid in the back of the eye and the ciliary body and iris in the front of the eye. [NIH]

Uveitis: An inflammation of part or all of the uvea, the middle (vascular) tunic of the eye, and commonly involving the other tunics (the sclera and cornea, and the retina). [EU]

Vaccination: Administration of vaccines to stimulate the host's immune response. This includes any preparation intended for active immunological prophylaxis. [NIH]

Vaccine: A substance or group of substances meant to cause the immune system to respond to a tumor or to microorganisms, such as bacteria or viruses. [NIH]

Vagina: The muscular canal extending from the uterus to the exterior of the body. Also called the birth canal. [NIH]

Vaginal: Of or having to do with the vagina, the birth canal. [NIH]

Valine: A branched-chain essential amino acid that has stimulant activity. It promotes muscle growth and tissue repair. It is a precursor in the penicillin biosynthetic pathway. [NIH]

Valves: Flap-like structures that control the direction of blood flow through the heart. [NIH]

Vascular: Pertaining to blood vessels or indicative of a copious blood supply. [EU]

Vascular Resistance: An expression of the resistance offered by the systemic arterioles, and to a lesser extent by the capillaries, to the flow of blood. [NIH]

Vein: Vessel-carrying blood from various parts of the body to the heart. [NIH]

Venous: Of or pertaining to the veins. [EU]

Ventricle: One of the two pumping chambers of the heart. The right ventricle receives oxygen-poor blood from the right atrium and pumps it to the lungs through the pulmonary artery. The left ventricle receives oxygen-rich blood from the left atrium and pumps it to the body through the aorta. [NIH]

Ventricular: Pertaining to a ventricle. [EU]

Venules: The minute vessels that collect blood from the capillary plexuses and join together to form veins. [NIH]

Vertebral: Of or pertaining to a vertebra. [EU]

Vestibular: Pertaining to or toward a vestibule. In dental anatomy, used to refer to the tooth surface directed toward the vestibule of the mouth. [EU]

Vestibule: A small, oval, bony chamber of the labyrinth. The vestibule contains the utricle and saccule, organs which are part of the balancing apparatus of the ear. [NIH]

Veterinarians: Individuals with a degree in veterinary medicine that provides them with training and qualifications to treat diseases and injuries of animals. [NIH]

Veterinary Medicine: The medical science concerned with the prevention, diagnosis, and treatment of diseases in animals. [NIH]

Vial: A small bottle. [EU]

Viral: Pertaining to, caused by, or of the nature of virus. [EU]

Virulence: The degree of pathogenicity within a group or species of microorganisms or viruses as indicated by case fatality rates and/or the ability of the organism to invade the tissues of the host. [NIH]

Virulent: A virus or bacteriophage capable only of lytic growth, as opposed to temperate phages establishing the lysogenic response. [NIH]

Virus: Submicroscopic organism that causes infectious disease. In cancer therapy, some viruses may be made into vaccines that help the body build an immune response to, and kill, tumor cells. [NIH]

Viscosity: A physical property of fluids that determines the internal resistance to shear forces. [EU]

Visual Acuity: Acuteness or clearness of vision, especially of form vision, which is dependent mainly on the sharpness of the retinal focus. [NIH]

Visual Cortex: Area of the occipital lobe concerned with vision. [NIH]

Visual field: The entire area that can be seen when the eye is forward, including peripheral

vision. [NIH]

Vitrectomy: Removal of the whole or part of the vitreous body in treating endophthalmitis, diabetic retinopathy, retinal detachment, intraocular foreign bodies, and some types of glaucoma. [NIH]

Vitreous: Glasslike or hyaline; often used alone to designate the vitreous body of the eye (corpus vitreum). [EU]

Vitreous Body: The transparent, semigelatinous substance that fills the cavity behind the crystalline lens of the eye and in front of the retina. It is contained in a thin hyoid membrane and forms about four fifths of the optic globe. [NIH]

Vitreous Humor: The transparent, colorless mass of gel that lies behind the lens and in front of the retina and fills the center of the eyeball. [NIH]

Vitro: Descriptive of an event or enzyme reaction under experimental investigation occurring outside a living organism. Parts of an organism or microorganism are used together with artificial substrates and/or conditions. [NIH]

Vivo: Outside of or removed from the body of a living organism. [NIH]

Wettability: The quality or state of being wettable or the degree to which something can be wet. This is also the ability of any solid surface to be wetted when in contact with a liquid whose surface tension is reduced so that the liquid spreads over the surface of the solid. [NIH]

White blood cell: A type of cell in the immune system that helps the body fight infection and disease. White blood cells include lymphocytes, granulocytes, macrophages, and others. [NIH]

X-ray: High-energy radiation used in low doses to diagnose diseases and in high doses to treat cancer. [NIH]

Yeasts: A general term for single-celled rounded fungi that reproduce by budding. Brewers' and bakers' yeasts are Saccharomyces cerevisiae; therapeutic dried yeast is dried yeast. [NIH]

Zymogen: Inactive form of an enzyme which can then be converted to the active form, usually by excision of a polypeptide, e. g. trypsinogen is the zymogen of trypsin. [NIH]

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